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Framing Language Through Gesture

Palm-Up, Index Finger-Extended Gestures, and Holds in spoken and signed interactions in French-speaking and signing Belgium

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FRAMING LANGUAGE THROUGH GESTURE

Palm-Up, Index Finger-Extended Gestures, and Holds in spoken and signed interactions in French-speaking and signing Belgium

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By

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Dedicated to Dominique

Talk is socially organized, not merely in terms of who speaks to whom in what language, but as a little system of mutually ratified and ritually governed face-to-face interaction, a social encounter

(Schegloff, 1974, p. 697)

Acknowledgements

T.S. Eliot wrote "the journey not the arrival matters". In the case of a PhD, let me be honest and say that this statement is not entirely true. As I am writing down these words, I cannot help but experiencing a bittersweet feeling: delighted that I am finally crossing the finish line and nostalgic as I am closing this dear project of mine (for now). As I reflect on the last four years, there are many people whom I have met along my doctoral rollercoaster that I would like to warmly acknowledge here.

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If this past year with you all has taught me one thing is to live life to the fullest.

Abstract

This dissertation explores the gesture-sign relationship by investigating interactional aspects of specific gestural forms in the spontaneous dyadic face-to-face conversations of four older signers and eight older speakers in the southern part of Belgium, comparing French Belgian Sign Language (LSFB) and spoken French (Belgian variety, BF).

Moving beyond the scope of traditional treatments of gesture in spoken (SpLs) and signed languages (SLs) in favor of a *comparative study of kinesic expression* in sign and in gesture (Kendon, 2008), this research has conducted quantitative and qualitative analyses of specific embodied strategies in discourse, namely, the Palm-Up (PU), the Index Finger-Extended Gesture (IFE-G), holds, and their concurrent gaze directions, and compare their usage in signed and spoken conversations. With a pragmatic perspective of language and adopting methodologies of corpus-based approaches to language data, this project highlights the different strategies and choices that signers and speakers perform using these gestural markers depending on contextual and interactional demands, allowing the interpersonal relationships with addressees to be regulated and to attend to the contingencies of the unfolding talk itself.

The results unveiled a number of intra- and inter-linguistic differences for the frequencies as well as similarities as for the interactive functions of the different gestural markers under study. PU frequencies did not show any clear-cut distinction between LSFB signers and BF speakers under study while IFE-Gs did establish a distinction. This can be explained by the conventionalized nature that is more attested in SLs than in SpLs. Nevertheless, when analyzed for their respective interactive functions in spoken and signed discourses, both forms carried similar roles. Signers mainly used the PU and the IFE-G for turn-taking regulating purposes (including feedback expressions) whereas speakers preferred them to manipulate the content of the information conveyed on the palm of their hands and the tip of their index finger (for delivery and common ground purposes). Moreover, reduced forms of PUs and IFE-Gs were attested in the data, signaling particular interactional moves from language users. As far as manual holds were concerned, the findings presented evidence that they were not mere insignificant moments of gestural and signing excursions. Rather, they worked as efficient and effective tools employed by hearing and deaf participants to achieve a number of pragmatic goals during the course of their conversations.

Rather than opposing gesture and sign from the beginning, this study has shown that interactants, whether deaf or hearing, make choices in dialogic situations and continuously deploy bodily behaviors that correspond to their (and their addressees') needs as the conversation evolves. The current gestural items under study constitute one of such bodily behaviors that are produced in ways that are sensitive to the interactional and linguistic contexts.

This study has revealed how considering gesture in SpL on a par with SL, favoring commonalities between gesture and sign rather than exacerbating differences, reinforced the argument for gesture to be part of linguistic activities, and as to what it means for spoken and signed languages to be *gestural languages*.

Résumé

Cette thèse de doctorat explore la dynamique entre geste et signe à travers l'analyse de diverses formes manuelles spécifiques et leurs fonctions interactives dans des conversations spontanées de quatre signeurs et huit locuteurs ainés en Belgique francophone, visant à comparer la Langue des Signes de Belgique Francophone (LSFB) au français parlé (variété belge).

Dépassant l'analyse traditionnelle du geste adoptée par les chercheurs en langue vocale (LV) et en langue des signes (LS), ce projet propose une approche axée sur ce que Kendon (2008) dénomme « une étude comparative de l'expression kinésique », à la fois en gestualité et en LS. Dès lors, à travers l'analyse quantitative et qualitative de trois paramètres manuels, à savoir les palm-ups (PUs), les phases de tenues, les pointés, et la direction du regard, cette étude démontre comment ces mécanismes sont utilisés par les individus belges ainés pour réguler leur conversation en LSFB, et comment cela se contraste (ou non) avec l'usage fait par les locuteurs en français parlé. Se basant sur une vue pragmatique du langage et adoptant des méthodologies d'analyse de corpus, ce projet souligne les différentes stratégies et choix que les signeurs et les locuteurs réalisent via l'usage de ces différents marqueurs manuels en fonction des exigences contextuelles et linguistiques, permettant ainsi de réguler l'échange avec leur interlocuteur et de s'occuper des éventualités du déroulement de l'échange même.

Les résultats révèlent certaines différences intra- et inter-linguistiques pour les fréquences ainsi qu'un certain nombre de similitudes pour les fonctions interactives des différents marqueurs manuels sous considération. Le PU n'a pas été utilisé de façon significativement différente entre les locuteurs du français et les signeurs de la LSFB. En revanche, les pointés montrent une différence entre les deux groupes au sein de cette étude. L'hypothèse étant que les pointés sont dotés d'une nature plus conventionnelle en LS qu'en LV. En ce qui concerne les fonctions interactives, PUs et pointés se rejoignent : les signeurs de la LSFB utilisent ces deux marqueurs principalement pour réguler la structure de leurs échanges mêmes (les tours de parole et les feedbacks) alors que les locuteurs du français les utilisent plutôt pour manipuler le contenu de l'échange (pour transmettre une information nouvelle ou partagée à leur partenaire). De plus, des formes plus réduites de PUs et de pointés furent notés dans les deux groupes. Les tenues manuelles se sont révélées être d'importants outils de gestion de l'interaction, tant en LS qu'en LV, permettant aux participants d'atteindre certains buts pragmatiques au cours de leurs conversations.

Plutôt que de diviser geste et signe, cette étude a démontré que tout individu, qu'il soit sourd ou entendant, fait des choix lors de ses échanges conversationnels et déploie constamment un certain nombre d'éléments manuels qui répondent aux besoins de leur partenaire et aux exigences de l'interaction même. Les éléments manuels investigués dans cette étude constituent un de ces outils réalisés à des fins qui sont sensibles au contexte interactionnel et linguistique dans lequel ils opèrent.

Cette recherche souligne l'importance d'aborder le « geste » en LV et LS sur un pied d'égalité, et comment cette approche, privilégiant des points communs plutôt qu'exacerber des différences, permet de replacer le geste au sein des activités linguistiques et ce que cela signifie pour les LV et les LS d'être des *langues incarnées*.

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List of Acronyms and Abbreviations

Abbreviations of sign languages:

ASL	American Sign Language
Auslan	Australian Sign Language
BSL	British Sign Language
DGS	Deutsche Gebärdensprache, German Sign Language
DSGS	Deutschschweizer Gebärdensprache, Swiss-German Sign Language
DTS	Dansk tegnsprog, Danish Sign Language
FinSL	Finnish Sign Language
ISL	Irish Sign Language
ISL	Israeli Sign Language
JSL	Japanese Sign Language
LIBRAS	Língua Brasileira de Sinais, Brazilian Sign Language
LSA	Lengua de señas argentina, Argentine Sign Language
LSC	Llengua de signes catalana, Catalan Sign Language
LSF	Langue des signes française, French Sign Language
LSFB	Langue des signes de Belgique francophone, French Belgian Sign Language
LSQ	Langue des signes québécoise, Quebec Sign Language
NGT	Nederlandse Gebarentaal, Sign Language of the Netherlands
NTS	Norsk tegnspråk, Norwegian Sign Language
NZSL	New Zealand Sign Language
RSL	Russian Sign Language
STS	Svenskt teckenspråk, Swedish Sign Language
TÍD	Türk İşaret Dili, Turkish Sign Language
TSL	Taiwanese Sign Language
VGT	Vlaamse Gebarentaal, Flemish Sign Language

General abbreviations:

<AD>	Gaze directed to the addressee
<AD:MOD>	Gaze directed to the moderator (in LSFB and FRAPé Corpora)
AGR	Agreeing Function
BF	Belgian French
<BO>	gaze directed toward a part of the participant's body
C1	LSFB Corpus
C2	FRAPé Corpus
C3	CorpAGEst Corpus
CAM	Gaze target is a camera present in the recording room
CL	Corpus Linguistics
<CL>	Closed Eyes
COGR	Common Ground Function
DELIV	Delivery Function
DIG	Digression Function

DISAGR	Disagreeing Function
ELL	Elliptical Function
EXPR	Expressive Domain of Language
FFSB	Fédération Francophone des Sourds de Belgique
Fevlado	Federatie van Vlaamse Dovenorganisaties
<FL>	Gaze lacking direction and no precise target, further divided into <FL:UP> and <FL:DOWN> when the eyes look upward or downward
Funct-D	Macro-Functional Domain
Funct-C	Micro-Functional Category
GP	Growth Point (McNeill's theory, 1992)
IDE	Ideational Domain of Language
IFE-G	Index Finger-Extended Gesture
INT	Interactive Domain of Language
IRA	Inter-Rater Agreement
K	Cohen's Kappa
L1/L2	Primary speaker or signer / Addressee
LH	Left Hand
MONI	Monitoring Function
OIR	Other-Initiated Repair
PLAN	Planning Function
PU	PALM-UP
R1/R2	Rater 1 or 2
RA	Raw Agreement
RH	Right Hand
<S1:EN>	Holds in the end of a gesture/sign
<S1:ST>	Holds in the beginning of a gesture/sign
S2/S3	Sample 2 or 3 in CorpAGEst
<S2:NE>	Holds in neutral position
<S3:IN>	"Floating index" holds
SLA	Second Language Acquisition
SL	Sign Language
<SP>	gaze directed to a position in space or within a role shift in LSFB
SpL	Spoken Language
STR	Structuring Domain of Language
SUSP	Suspension Function
TISLR	Theoretical Issues in Sign Language Research
TURN	Turn-Regulating Functions (to open, give, hold, and close)

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CHAPTER 0
An Introduction to Gesture, Sign, and Language

Signs were not simply iconic pictures drawn in the air with the hands,
but rather were organized symbols composed of discrete parts.
(McBurney, 2012, p. 921)

The motivations that have prompted the scientific community to revisit constantly the dynamics of gesture in relation to sign, and the paramount implications these studies have had on the current theories of language are brought to the forefront.

The starting point is that there are more than seven billion individuals on the planet with varying cultural ways of living, talking, and communicating. Despite such differences, humans, deaf or hearing, draw on a series of visible bodily behaviors to convey and comprehend meaningful pieces of information in their ordinary conversational exchanges. Such a view is best instantiated in Kendon's (2004) words as he writes that: "willingly or not, humans, when in co-presence, continuously inform one another about their intentions, interests, feelings and ideas by means of visible bodily action" (p. 1). This reflects what is explored in the present work. Particular attention, however, is brought to some aspects of linguistic analysis that have typically been considered as backgrounded phenomena, in both, gesture and sign. By examining the interactive sides of a series of bodily behaviors among signers and speakers' conversations in the French-southern part of Belgium, this study hopes to unveil a number of shared interactional practices that have until now been overlooked in numerous language studies.

This chapter first provides an overall historical background on gesture and sign language linguistics with the aim of contextualizing the issue regarding the status of gesture in relation to sign, including the manual practices under study. Afterward, it outlines the goals and research questions of the present dissertation along with the formulated hypothesis. Finally, it offers an overview of the organization, chapter by chapter, of the dissertation.

1 Gesture and Language

The human capacity for language is not simply a vocal phenomenon but also a visual one. It is best instantiated in the ways individuals engage with one another in contexts of face-to-face interactions. This idea has now gained traction in the scientific community, but language was not always considered multimodal.

Across languages and cultures, individuals draw on a series of elements from the visual modality to communicate. Much of the information conveyed when individuals talk – an ability acquired around the first year of life – involves the visuo-spatial channel, including facial expressions, gaze, body movements, and gesture. Gesture is ubiquitous and natural in human communication and is often performed subconsciously. Although the communicative, social, cultural, and linguistic aspects of people's gesturing may differ in terms of frequency and display variation (Chu et al., 2014; Kita, 2009), gestures are utilized universally by all individuals. Moreover, the bond between gesturing and speaking seems innate; congenitally blind people, who have never seen others gesture, gesture when speaking (Iverson & Goldin-Meadow, 1998; Özçalışkan, et al., 2016).

However, despite early interests (Quintilian's *Institutionis oratoriae*, 1st century BC), gestures were neglected for a long time. Although there were some notable contributions (e.g., de Jorio, 1832), the linguistic community of the nineteenth century downplayed the role of gestures as a worthy aspect of language, and by the twentieth century, gestures were largely overlooked as most researchers studying language gave precedence to written and spoken aspects of language and rarely paid attention to the visual modality.

As stressed by McNeill (2005), two major shifts coupled with other factors triggered the rebirth of the enthusiasm for gestures by the end of the twentieth century. The first major shift was Efron (1941). His seminal study on the gestures of Italian and Jewish immigrants living in New York in the 1930s was a first major turning point in the history of gesture research. His work is often considered as the moment when the accent was put on real life gestures accompanying speech, instead of rhetoric gestures, which had occupied the major focus of interests since Quintilian. The second shift occurred with Kendon (1972), which has had major research implications until this day. From Kendon onward, researchers started to investigate gesture and treat it "as parts of language itself" (McNeill, 2005, p. 13), shedding light on the close relationship between gesture and speech. This second shift consequently enabled the field to offer "new insights into the nature of speaking, thinking, remembering, and interacting [...] in a social context" (McNeill, 2000, p. 9). These two shifts coupled with the revival of concerns about language origins, the gesture- *vs.* speech-first theory (e.g., Corballis, 2003), the newly interests in SLs and the cognitive turn – brought about by Chomsky's (1965) work – were additional factors that enabled the rebirth of the scientific enthusiasm toward gesture.

Over the past decades, the focus on gesture has enhanced with research showing its imminent importance in relation to communication, cognition, and language (Kendon, 2004; McNeill, 1992; Özyürek & Woll, 2019). Gesture has been the object of extensive research connecting researchers from backgrounds as diverse as the humanities, linguistics, psychology, social sciences, neuropsychology, and computer engineering. Yet, connecting gestures to spoken language only represents half of the problem. It took a while for researchers to recognize gestures as part of language, and by language, it was to be construed as *spoken* language. The other side of the linguistic problem is how to account for the link of gesture with sign languages (SLs), which are languages that bear the whole weight of using the whole body as a medium to produce language. In this case, researchers also do struggle with recognizing and assessing the nature of this gesture-sign relationship. The next section addresses this by providing an account of the History of SLs and SL linguistics to help understand the current positions toward gesture, sign, and language.

2 A few Words on the History of Sign Languages[1] (and LSFB)

SLs are the natural languages in the visual-spatial/gestural modality that deaf individuals use in their everyday lives to communicate. They are natural human languages because they are used every day and possess their own independent and fully-fledged linguistic systems. These languages occupy the visual-gestural modality of language in that signers need to activate their whole body's articulators (hands, gaze, facial expressions, head, torso, and so on) to produce language.

While there is language contact between deaf and hearing communities, SLs have evolved independently from spoken languages (SpLs). Despite the fairly common belief, especially among hearing individuals, there is not one universal SL but a plethora of SLs used by Deaf communities around the world[2]. Thus, in a similar vein with SpLs, SLs possess their own (socio-)linguistic variations. For instance, even in different countries where French is spoken as the primary language (e.g., Canada, France, and Belgium to only cite three main examples), different SLs have emerged and are used in these locations by deaf people, viz., Quebec SL (LSQ), French SL (LSF), and French Belgian Sign Language (LSFB).

Along with this long held misconception about a unique universal SL, sign languages were prevailingly considered as nothing more than primitive systems of gestures or pantomimes, lacking any linguistic status. They are also considered as the linguistic twins of spoken languages. This prevailing view is reflected in the American structuralist, Bloomfield, who has claimed that SLs are "merely developments of ordinary gestures" in which "all complicated or not immediately intelligible gestures are based on the conventions of ordinary speech" (1933, p. 39). In other words, SLs have been conceived as a "derivative" of language.

Since the first half of the twentieth century, it can be stated that SLs have come a long way since these initial misconceptions. However, the path toward the recognition of SLs as proper human natural languages, with their own linguistic system, did not happen overnight and research on linguistic aspects of SLs only began over of course of the last century.

[1] For a comprehensive review of the history of SLs and SL linguistics, see McBurney (2012).

[2] Moreover, SLs are not solely used by deaf individuals but, as highlighted by Vermeerbergen and Nilsson (2018), there are actually more hearing than deaf individuals who know and make use of SLs, "as it is also used by relatives and friends of deaf people and by people who use it in a professional capacity, e.g., signed language interpreters" (p. 9) and to that, I can add, SL translators as it is the case at the LSFB-Lab.

2.1 Modern SL Linguistics: The early years

The early years of SL research were marked by the pioneer and groundbreaking work of two scholars, Bernard Tervoort in Europe and William Strokoe in the United States. Tervoort (1953) wrote the first doctoral dissertation on a SL communication issue by investigating the use of signing in deaf children in the Netherlands. Stokoe's (1960) work is seen as the founding block of SL linguistics. *Sign Language Structure* is the first description of the linguistic structure of American Sign Language (ASL). Stokoe contributed to the field of SL by demonstrating that individual signs could be broken down into distinct internal constituents – in a similar way as words into phonemes. They were first identified by Stokoe as, the *tabula* (position of the sign), the *designator* (hand configuration), and the *signation* (movement or change in configuration).

During this early linguistic period, finding analogues between SpLs and SLs at all levels of linguistic structure was the impetus behind most researchers' work given the existing misconceptions of SLs and thus the need for linguists to ground SLs as proper and legitimate languages.

In the continuity of Stokoe's (1960) pioneering work, other scholars began to investigate different SLs mainly in Europe toward the end of the 1970s and early 1980s. The results of such incentives were made visible, for instance, in the organization of various scientific events reuniting linguists for the first time on diverse SL issues (e.g., lexicon, sociolinguistic variation, phonological, morpho-syntactic aspects of linguistic analysis, as well as aspects of the Deaf history and culture). In Sweden, the first international symposium on SL issues was organized in June 1979 in Skepparholmen, out of which the proceedings were later made available. In 1982, the first Eur*opean Congress on Sign Language Research* was held in Brussels. Other incentives included the first edition of the *Theoretical Issues in Sign Language Research (TISLR)* conference convened in 1986 in Rochester (USA) and the *International Sign Linguistics Association* was established in the same year.

The research tendency during the early years of SL analysis was deeply influenced by two opposite views. Karlsson (1984) referred to them as the "oral language compatibility view" *vs.* the "sign language differential view". While the former adopted a research focus where SLs were examined in function of SpL to find parallels at all levels of linguistic structure, the later emphasized the unicity of SL systems as having their own linguistic structure (e.g., Cuxac 1983). During this initial period, the majority of scholars adopted the compatibility view, emphasizing that SLs were "structured, acquired, and processed (at the psychological level) in ways" (McBurney, 2012, p. 936) that were quite similar to SpLs. As mentioned, this was particularly the case to make SLs publicly recognized languages as legitimate for linguistic analysis in their own right, on the one hand, and legitimate for the education of deaf individuals, on the other hand.

2.2 Post-modern SL Linguistics: From 1985 onward

The next period in SL research, described as a post-modern period by Woll (2003), started around 1985 (Vermeerbergen & Nilsson, 2018). In contrast with the early years driven to establish analogues with SpLs, this second historical period emphasized the specificities of SL systems. Studies gradually shifted focus to unveil specific properties of SLs, such as the grammatical exploitation of space, the linguistic use of facial expressions and gaze, the presence of iconicity and gesture within SL (e.g., Liddell, 2003) as opposed to the spoken modality, putting to the fore that SLs might be more alike to each other. Therefore, the ideas as regards the inter-connections between SLs and SpLs slowly shifted from the post-modern period onward. This, in part, was due, on the one hand, to the growing number of SLs being examined along with an impetus to compare SLs with gestural features of SpLs, on the other hand.

It was during that period that SL studies extended beyond the United States. In particular, the number of SLs investigated included more and more comparative cross-linguistic analyses of related and unrelated SLs, even non-Western SLs (Perniss et al., 2007), shedding light on the emergence of typological properties of SLs. Notably, the investigations of non-Western SLs revealed that SLs were, in reality, not as typologically homogenous as claimed previously. While there were striking structural parallels between different SLs, systematic and comparative work conducted on a wider range of SLs underlined some variation (e.g., negation and plural marking; see Perniss et al., 2007). The majority of comparative cross-linguistic studies were mainly devoted to the following aspect of linguistics: phonology (e.g., Australian SL (Auslan) *vs.* New Zealand SL (NZSL), Schembri et al., 2009), prosody (Israeli SL (ISL) *vs.* ASL, Dachkovsky et al., 2013), morpho-syntactic issues (e.g., reflexive pronouns in Sign Language of the Netherlands (NGT) *vs.* Russian SL (RSL), Kimmelman, 2009; variable subject expression in Auslan *vs.* NZSL, McKee et al., 2011), and discourse studies, which slowly came to be more and more present in SL research (e.g., colloquial analysis of Japanese SL (JSL) conversations, Bono et al., 2014; discourse markers in LSFB and Catalan SL (LSC), Gabarró-López, 2017 and in ASL, Shaw, 2013). There was also increasing attention paid to visual-gestural exploration of gesture with sign in SLs. However, this exploration remained generally to the background. In fact, the consensus in the early works devoted to the analysis of gesture in SLs conceived that gestures either moved away from the manual stream in SL (e.g., to the mouth, as argued by Sandler, 2003) or they became incorporated into the linguistic structure (Liddell, 2003a, 2003b).

2.3 SL Linguistics: Moving forward

In the last decade of SL research, an increasing number of SLs are constantly being examined and contemporary approaches to SL linguistics have expanded and specialized across a wide range of disciplines. This has also been facilitated by the advent of technology and the development of tools for the collection, annotation, and diffusion of SL data. Therefore, the last decade has also seen the development of a greater number of SLs being studied as well as emerging SLs being the primary topic of several studies. These SLs include, for instance, Kata Kolok (de Vos, 2013) and Yucatec Maya SL (Le Guen, 2019) (see Meir et al., 2010 for an overview). No doubt that the advancement in technology will help in the exploration and documentation of these emerging SLs over time.

These new perspectives on SLs have led to the consideration of SLs as heterogeneous systems in which meaning is conveyed through a combination of composite (Enfield, 2009) multimodal elements that both speakers and signers draw on to communicate. In this line of thought, an analytical consideration has emerged suggesting that when SLs are compared to SpLs, gestures need also to be part of the analytical equation by taking into account not only speech but the speech+gesture ensemble as a comparative equivalent to signs of SLs (Vermeerbergen & Demey, 2007).

Hence, a new scientific (linguistic) paradigm regarding the multimodal complex nature of the human language capacity has emerged (Ferrara & Hodge, 2018). Looking back on the past decades of SL linguistics, which came into being only about 50 years ago, stresses how young this field of study actually is and how fast it has grown in this short period. In terms of general conception, the field has traveled a long way since the early years where the importance was to prove to the public, popular and scientific, that SLs were full, complex and independent languages that today can genuinely and legitimately be compared to the gestures produced in SpLs. It is notably against the solid historical and theoretical background that the relationship between gesture and sign is explored. It is naturally without question that this type of linguistic research into the complex articulation of sign and gesture into language will enrich the understanding of the human capacity for language as a fundamental multimodal phenomenon.

2.4 A few words on the SL under study: LSFB

The SL investigated in this research project is used by the deaf community in the French-southern part of Belgium (viz., Wallonia) and recognized as French Belgian Sign Language (LSFB). Indeed, while lacking official status, LSFB has been recognized since 2003 along with its Flemish counterpart, Flemish Sign Language (VGT, standing for *Vlaamse Gebarentaal*) in 2006, which is primarily used by the deaf community in Flanders (Van Herreweghe et al., 2015). Yet, given the specific nature of languages co-existing in Belgium, both SLs are used in the country's capital, Brussels. The same holds true for the SpLs, French and Flemish. Both, LSFB and VGT, evolved from the Belgian SL that was used before the 1970s, and then split in 1977 when the national Deaf Federation (NAVEKADOS) split into the *Fédération Francophone des Sourds de Belgique* (FFSB), on the one hand, and the *Federatie van Vlaamse Dovenorganisaties* (Fevlado), on the other. From this period onward, the activities that used to be organized (and still are today, independently) by these two institutions led to fewer contacts between both deaf communities on each side of the country, which resulted in the separate evolution of both SLs.

While LSFB was recognized in 2003 by an official decree, the number of deaf individuals is comparatively low: less than six thousand deaf signers from Wallonia and Brussels but averaging 25 000 when taking into account the number of people who know the language (FFSB, 2014). Geographically, LSFB has seven variants, out of which four are located in the Brussel area (Berchem-Sainte-Agathe, Bruxelles-Ville, Uccle and Woluwé), one in Liège, and two others from Ghlin and Bouge.

Despite the relatively low demographics, some changes have taken place over the past two decades (2000-2020), which have had an impact on its evolution following recent developments, in technology, in particular. In 2000, LSFB became one of the languages taught as part of the bilingual teaching program (LSFB-French) taking place at the Ecole Sainte Marie in Namur. This project aims at ensuring that deaf and hard of hearing children are co-enrolled in the school with a hearing majority and both groups learn to live together. This integration model is close to the reality that deaf and hard of hearing children will experience in the future in society. Children can use either French or LSFB to communicate, and they are offered parallel instruction to acquire both languages, paving the way toward accessing higher education (Ghesquière & Meurant, 2018). Staying in the education sphere, in 2014, a new academic cursus in interpreting and translating studies in French-LSFB opened in Brussels. These two educational aspects of LSFB also resulted in scholarly projects working on, for instance, issues in interpreting in a bilingual context (Brillant et al., 2016), translating studies involving LSFB (Heylens, 2019), and projects revolving around the issues of the education for the deaf in a co-enrolment setting (Ghesquière & Meurant, 2018).

Research conducted on the language itself started in the 2000s. The University of Namur is the only university in the Fédération Wallonie-Bruxelles to conduct research in SL linguistics. The first and second doctoral dissertations in LSFB were defended in 2006 (Meurant, 2008) and 2013 (Sinte, 2013), respectively. Meurant (2008) conducted a study on the anaphoric and deictic functions of eye gaze in LSFB and Sinte (2013) investigated aspects of time in LSFB. Later on, various fields of inquiry covering a range of linguistic topics have been the object and focus of different studies. Three other doctoral dissertations were conducted in the following areas of linguistic research: an exploration of phonological aspects and phonetic variation (e.g., weak hand drop) across registers in LSFB (Paligot, 2018), a contrastive analysis of discourse markers (PALM-UP, SAME, and BUOYS) in LSFB and LSC (Gabarró-López, 2017), and a study of (dis-)fluency markers in LSFB (Notarrigo, 2017). Other research projects on LSFB include works on the comparison of elements of reformulation in LSFB and spoken BF (Mainil & Meurant, 2017), simultaneity (Meurant, 2010) as well as corpora studies (Meurant & Sinte, 2013) including the elaboration of the LSFB Corpus (Meurant, 2015) and, more recently, the creation of an online contextual bilingual French-LSFB dictionary (2019-2021) (Meurant et al., 2018). The current research project on the comparison of gestural markers across both languages, LSFB and BF, falls within this dynamic environment of scientific enquiry and takes into account the data drawn from the LSFB Corpus for the part regarding the analyses of LSFB material.

3 Sign and Gesture Dynamics in this Dissertation

For a long time, SLs were considered as mere forms of gestures, which left no room for the contrastive and multimodal approach of gesture in relation to sign and language. As such, the early years of SL research were characterized by prioritizing grammatical and lexical descriptions of signs (Cibulka, 2015), leaving the functioning of the building blocks of social interaction largely overlooked. One reason for this was the emphasis on finding analogues to SpLs at all levels of linguistic structure, on the one hand, and differences between SLs and gesture, on the other (Vermeerbergen, 2006; Vermeerbergen & Nilsson, 2018). Underlying this impetus was a pressing concern for the grounding of SLs as any other spoken languages. In later years, studies gradually shifted focus to unveil specific properties of SLs, giving rise to a number of contrastive analyses including more (related and unrelated) SLs, along with comparisons with gestural features of SpLs. Thus, the field of SL linguistics has come a long way since the initial erroneous conceptions. Yet, the same holds true for gestures themselves, which were disregarded for a long time deemed as not being an integral part of language (Kendon, 2004; McNeill, 1992). Moreover, the important recognition of gesture as part of language was only established later than the recognition that SLs were legitimate languages, just like SpLs. A likely explanation for this fact was related to the nature of linguistic theories at the time, which tended to take "what can be spoken or written as their main domain of investigation and have been mostly occupied with aspects of language that denote things arbitrarily and categorically (e.g., words, phrases, sentences)" (Özyürek & Woll, 2019, p. 68).

Nowadays, with the advent of technological advances, a new era of linguistic analysis has begun, characterized by a growing interest in the gesture-sign dynamics and the resulting nature of this relationship with language. For the last decades, SLs have been conceived as heterogeneous linguistic systems in which gestural aspects may coexist. In the current academic sphere, the relationship between gesture, sign and language is constantly being revisited and discussed, implying a new paradigm shift on the fields of gesture studies, SL linguistics, and the whole linguistic branch. And yet, these new intriguing questions pose a greater number of theoretical (conceptual), methodological, and analytical challenges that need to be addressed.

Indeed, the variety of ways in which researchers have approached this gesture-sign interface has led to different conclusions and positions as regards the nature of this relationship. Some have argued that this lack of consensus, in reality, stems from a conceptual problem related to the definition of gesture itself (Andrén, 2014; Kendon, 2008; Müller, 2018). Accordingly, one of the first steps taken in this dissertation is to clarify the term "gesture" (see Chap. 1) as it is employed in the current framework.

To this end, the argument developed aligns with several researchers' views (e.g., Andrén, 2014; Cibulka, 2015; Kendon, 2008; Müller, 2018; Shaw, 2013, 2019) that emphasize the need for more cross-linguistic work focusing on commonalities between SpLs and SLs in order to cast light on the gesture-sign relationship. While there is a basic clear-cut distinction between speech and gesture, which can be drawn based on the modality used to express one or the other (visuo-spatial for gesture *vs.* vocal for speech), such a binary distinction becomes murky for gesture and sign where the frontiers blur visually.

In the light of the current debate on the relationship between gesture and sign (and language), and following up on the incentive to analyze the two side-by-side, this dissertation is a quantitative and qualitative study on the interactive roles of different gestural elements in spoken Belgian French (BF) and LSFB. The overarching aim is to compare the interactive uses of the following gestural elements, namely, PALM-UPs (PUs), Index Finger-Extended Gestures (IFE-Gs), holds and the direction of gaze accompanying these gestural makers that enable speakers and signers to regulate the dialogic flow of the interaction with their addressee to achieve intersubjectivity, that is, the participant's "attention to the addressee as a participant in the speech event, not in the world talked about" (Traugott & Dasher, 2005, p. 22), within and across the languages under study. This study is based on three corpora, namely, the LSFB Corpus (Meurant, 2015) the CorpAGEst Corpus (Bolly & Boutet, 2018), and an ongoing corpus project, FRAPé. The three sets of data allowed to study a wider range of participants and contexts. One of the goals being, by comparing LSFB and BF, to conduct one of the first cross-linguistic studies between both languages (see Crible & Gabarró-López, in prep., on coherence relations in LSFB and BF) when the same methodology has been applied.

To approach gesture and sign, the current study draws on three gestural markers, the PU, the IFE-G, and holds and their association with gaze directions. Their selection is motivated by several factors. First, their analysis from an interactional point of view is lacking and has remained largely unexplored in gesture and SL research.

Secondly, they all embody relevant cases in point for analyzing the nature of the relationship between gesture and sign. To be able to compare gesture and sign side-by-side, the exploration of parallel gestural phenomena occurring in both languages was necessary. Therefore, these gestural markers constituted the common ground needed for the current study in BF and LSFB. Lastly, they were conducive to unveil intriguing aspects of the human language ability as multimodal in achieving specific goals in the social context. Indeed, the gestural markers have been reported to serve a number of revealing interactive functions in SL and SpL, respectively. The relevance and importance for integrating them in this regard is presented next.

The prototypical case for observing gesture between SpL and SL is the **PALM-UP** (PU). PU encompasses a very broad category whose form can assume a wide range of functions (van Loon, 2012), including interactive in initiating or closing a turn, providing and eliciting backchannels (Engberg-Pedersen, 2002; Mesch, 2016), seeking agreement, acting as a pause-filler (McKee & Wallingford, 2011). As Cooperrider et al. (2018) claim, PU is "a critical case study for scholars of visual-bodily communication" (p. 2). Therefore, its selection as one of the markers of analysis offers "one possible starting point for a systematic comparison" (Müller, 2018, p. 15) between gesture, sign and language. Yet, research dedicated to its analysis still lacks substantial contrastive approaches, that is, not only comparisons of PUs in several SpLs and SLs (except for Gabarró-López, 2017, 2020) but also analyses of SpLs contrasted with SL data to obtain results across languages and modalities (Müller, 2018). Moreover, while previous research points out that, unlike content-oriented gestures, PUs are interactional in nature (Cooperrider et al., 2018; Teßendorf, 2014), the interactive functions of PU remain largely unexplored compared to its modal and structuring functions, which is why the present study will cast light on this aspect.

Index Finger-Extended Gestures (IFE-Gs) are the second marker selected for playing a role in social interaction. Often portrayed as mere index pointing in gesture and SL, this gesture has mainly been studied as a prototypical deictic reference. Yet, work has shown that they do not seem to systematically be associated with deictical forms only. Jokinen (2010) pointed out that it "may have a descriptive function if it is used as a deictic pointing gesture, a pragmatic function if it emphasizes an important word in an utterance, or an interactive function if it points to the next speaker" (p. 35). In the same line, Mondada (2007) showed their potential in regulating speakership and interactional spaces, and Jokinen (2010) further confirmed how they indicated common ground, acknowledgement, elicited shared understanding, and offered new information to addressees. Further research on their dialogue activity, especially in SLs, is thus heavily needed. The IFE-G will be approached in this study as a candidate for the management and information coordination in signed (LSFB) and spoken (BF) interactions.

The following category, manual **holds**, has usually not been included in analyses because "they occur for reasons other than the production of lexical items" (Cibulka, 2016, p. 449). At first glance, holds seem easy to define as a phase where the hand is held in a static position. However, when being confronted to real-life data in the present corpora, the task turned out more difficult, imposing methodological decisions. For instance, when to consider the temporary cessation of movements as legitimate holds (Notarrigo, 2017)? And how can these non-movement phases play a role in social interaction? Several scholars have, in reality, demonstrated the interactive roles of holds in speakers' and signers' conversations. Some researchers recognized the important role of holds "as part of an established interactional practice rather than as failure or incomplete signs" (Cibulka, 2016, p.459). Holds have shown to establish collaboration during repair and word searches, regulate turn taking, and prompt for a response in both, SpLs and SLs (Groeber & Pochon-Berger, 2014). This is why they were integrated in the analyses.

Gaze direction, as the unique non-manual feature examined here, will come to punctuate the behavior of the above-mentioned gestural markers. It was chosen for its long recognized role in regulating engagement, dealing with conversational activities and social actions (Holler & Bavelas, 2017; Rossano, 2012). The idea of looking at gaze in the analyses is to detect the types of gaze accompanying the different hand movement or non-movement (in the case of holds). One of the hypothesis is that different gaze directions will be associated with specific hand units. For example, a sustained gaze at the addressee will show speakership involvement while a floating gaze – a vague gaze detached from the addressee – will be more associated with word searching activities. The values used to describe gaze direction are based on Bolly and Boutet (2018) and Notarrigo (2017).

The advantage of comparing LSFB to BF is that SL pushes to "reconsider the linguistic status we ascribe to meaningful, nonverbal behaviors that emerge when […] people engage in face-to-face interaction" (Shaw, 2013, p. 31). The comparative analysis aims neither at finding gestural analogues in each language nor at investigating the historical and diachronic changes taking place over time between gesture and sign. Rather, it takes a synchronic comparative approach to signed and spoken data to reveal a more thorough picture of how interaction works in these two languages by focusing on a similar set of gestural elements. More precisely, the idea is to explore gesture, not only for its iconic, imagistic nature in the McNeillian sense (Shaw, 2013, 2019), but also as an interactive strategy. Adopting this framework contributes to a better description of the human communication system. In addition to approaching gesture from an interactive perspective, this project responds to the call for more "systematic cross-linguistic research on the multimodal use of language in its signed and spoken forms" (Müller, 2018, p. 2).

4 Goals, Objectives, Research Questions and Hypothesis

Language does not only enable individuals to express utterance content but also to interact. The overarching aim in the present work is to shed new light on some of the mechanisms that hearing and deaf individuals use to interact with their addressee during face-to-face conversations. Hence, this dissertation aims to expand the study of social interaction as used in a SL (LSFB) by focusing on a series of specific manual and gaze practices that signers deploy for regulating the interactional dimension of their dialogues, and how these uses compare to those deployed by speakers in a SpL (BF). These gestural resources highlight how social interaction can be perceived as a situated and mutual achievement led by participants in conversations. It is also a study of how different ways of considering meaning drives *our* understanding of language in social interaction and its organization. Through the analyses of PUs, IFE-Gs, holds, and gaze directions in dyadic face-to-face encounters, the current reflection shifts the analytical focus from considering gestural practices on opposite sides in SpLs and SLs and argue for their analysis side-by-side instead. This challenges the common view that meaning is inherently propositional; and ultimately, pushes to (re-)consider and reinstate other manual forms (e.g., holds) into the wider spectrum of what gesture is and how it is best construed as a situated communicative practice.

4.1 Research goals and objectives

The main goals are threefold. The first goal is to examine the degree of variation observed in the frequency of use of the manual forms under study (PU, IFE-G, and holds) across languages, corpora, and participants, their interactive functions in LSFB and BF discourses, along with the overlaps between those manual forms and different kinds of gaze directions. Then, the second main goal is to conduct a cross-linguistic study comparing LSFB and BF across modalities using comparable corpus data (i.e., the LSFB Corpus *vs.* the FRAPé Corpus) and explore what happens with a third BF multimodal corpus when the methodological conditions differ within languages (CorpAGEst *vs.* FRAPé) and across modalities and languages (LSFB *vs.* CorpAGEst). And at last, to add a stone to the bridge encompassing the current discussions revolving around the gesture-sign paradigm by comparing LSFB on a par with BF (speech+gesture) through the interactional exploration of different gestural strategies that are unexplored in gesture and SL research.

Concretely, to reach the above-mentioned goals, the following objectives are established. The first is to shed new light on the roles of the gestural elements under scrutiny in social interaction of two distinct languages by studying their distribution and frequency of occurrence in LSFB and BF, and then to identify similar and/or different discourse functions. Lastly, particular attention is paid to the interactive dimension that these gestural components carry within the spontaneous conversations of LSFB signers and BF speakers. To achieve this, the following aspects are examined: (i) the distributions and frequencies of occurrence in each language, corpus, and participant; (ii) the specific discourse functions and their implications in the management of social interaction; (iii) the combination of different gaze directions with the manual forms and interactive functions.

4.2 Research questions

Based on these goals and objectives, the main research questions addressed in this dissertation are:

❖ How often do LSFB signers and BF speakers, when compared, make use of the analyzed manual and gaze practices in conversation? Do their uses differ from one language to another? From one set of data to another? From one signer/speaker to another?

  - A study of the intra- and inter-individual degree of variation in the frequency of use of these gestural markers.

❖ How do LSFB signers and BF speakers, by these gestural markers, manage to achieve interactive purposes in face-to-face conversation? In other words, for what kinds of communicative purposes are these manual and gaze practices used in a signed *vs.* spoken interaction? Are there parallels or specific features of use in each linguistic context?

- A study of the discourse functions with a focus on interactive ones.

❖ Does gaze direction combine with specific manual forms and interactive functions? If so, which ones?
  - A study of the association between manual gestural markers, gaze direction, and interactive functions.

4.3 Working hypothesis

This dissertation lies at the crossroad between sign and gesture. Following Özyürek (2012) who puts forward the idea that although "a continuum from gesture to sign exists in terms of conventionalization and emergence of linguistic features, different semiotic levels of the continuum also co-occur within SLs, that is, SL and gesture can co-exist" (p. 641). The main question is to what extent comparing sign and gesture+speech (Vermeerbergen & Demey, 2007) can highlight the understanding of the gesture-sign paradigm (Goldin-Meadow & Brentari, 2017) in speakers' and signers' interactions. Often then, the main question has been to define what is sign and what is gesture on different terms. Focusing on dividing the two has concealed areas of overlap (Kendon, 2008). Rather than treating them as distinct, opposite entities in each language, this project argues for their integration on common ground. I adopt a different view than what researchers have often argued. Overall, studies tend to focus on the roles of gesture at the propositional level in signed and spoken production (Emmorey, 1999; Liddell & Metzger, 1998). For instance, Emmorey (1999) states that even though signers do gesture by using manuals and non-manuals, they do it in a distinctive way than that of speakers. Although I do not deny differences between gesture and sign depending on scholars' research objectives and aims, the current approach advocates for a different take.

Following several scholars on the gesture-sign issue, the working hypothesis is that meaning is not constructed only conceptually, at the propositional level of language, but is also shaped interactionally (Cibulka, 2015; Ferrara, under rev.; Shaw, 2013, 2019). Rather than emphasizing differences between gesture and sign, this study argues for their analysis side-by-side. The view is to observe the specific patterns of the selected manual and gaze practices in each dataset to pinpoint whether their use is different (or similar) from one language to another or from one participant to another, and why. The current position is further grounded in the idea that examining shared manual features in a spoken and signed language, in turn, reinforces the argument for gesture as part and parcel of linguistic activities, regardless of whether users of such forms primarily rely on their mouth or their hands as a medium of expression. Research has made inroads that regardless of which canal is preferred (vocal-auditory *vs.* spatio-gestural), the human ability for language is multimodal, and is consequently able to convey information at "different semiotic levels" (Özyürek, 2012, p. 642). Focusing on the differences has had the unfortunate consequence of keeping the similarities between systems to the background (Andrén, 2014; Cibulka, 2015; Kendon, 2008; Müller, 2018; Shaw, 2013, 2019). This is why the differential view cannot fully justify all the interrelations that might emerge and exist between gesture, sign, and language when they are explored side-by-side. As examined in the continuity of this dissertation (see Chap. 1), one of the reasons for the promotion of a divide between sign and gesture depends on the definition of gesture itself and the researcher's objectives (Müller, 2018).

Ultimately, by considering sign and gesture together, it will become possible to understand more the fundamental nature of language. Broadening the conception of gesture will revisit the dichotomy that commonly divides world's languages into two, the vocal-auditory modality for SpLs *vs.* the visual-gestural for SLs (Özyürek, 2012). This vision simply cannot account for the complex multimodal organization of the human communicative ability.

5 Organization of this Dissertation

The present research is built according to three major parts, a first part that displays the theoretical framework (corresponding to chapter 1), a second part that presents the methodological approach (corresponding to chapter 2), and a third part that contains the analysis of each manual gestural marker in LSFB and BF (corresponding to chapters 3, 4, and 5). A last part is devoted to the implications and conclusions of this dissertation. Each chapter is summarized in the following lines.

Chapter 1 frames the theoretical aspects of the current research that pave the way toward a positioning in favor of gesture and sign on common ground. Admittedly, I begin by defining what has been described as one of the core problems in assigning gesture's place in relation to sign, viz., the notion of gesture itself. In this chapter, I discuss the different categories and functions of gesture reviewed thus far in the literature to bring the focus on its neglected side: its interactive dimension. Particular attention is also paid to the analysis of interactive aspects in both, gesture and SLs studies. This chapter also presents a state of the art on the different scholars' positions on the treatment of gesture in SL, and their conclusions. I present how different theoretical frameworks in both, SLs and SpLs, have ultimately affected how gesture is conceived in language. In light of several scholars' work, I further their claims that language is multimodal. The body is a locus for meaning in interaction that includes all sorts of visible bodily actions available at all times for speakers and signers' interpretation (Goodwin, 2007; Kendon, 2008; Shaw, 2019), and that these visible units of meaning are deeply integrated with language, whether in its signed or spoken modality.

The gestural markers examined in the current work are drawn from a set of three multimodal corpora of video-recorded material including face-to-face dyadic conversations in LSFB (the LSFB Corpus) and BF (the FRAPé and CorpAGEst Corpora). The corpora are introduced in **chapter 2**, which also provides crucial methodological information on the annotating process. In particular, chapter 2 presents the coding scheme used for the formal and functional annotations of the data as well as the forthcoming analyses.

The following chapters (3, 4, and 5) display the results of the analyses conducted on each of the three gestural markers explored in this dissertation (PU, IFE-G, and holds). Before the analyses and the results, the reader will encounter two sections in each chapter that presents a theoretical and methodological overview of each marker under analysis and the various treatments they have received in both, gesture and SL research. **Chapter 3** is devoted to the PU in LSFB and BF, **chapter 4** explores the IFE-G, and **chapter 5** examines the uses of manual holds as interactive strategies. Each chapter explores the different uses of each manual form as the fundamental interactive practices deployed by LSFB signers and BF speakers to achieve a set of interactive goals in their conversations.

Finally, **chapter 6** summarizes the main findings presented in chapters 3, 4, and 5 and discusses the implications for an understanding of language that takes into account the vast repertoire of semiotic properties that users of a signed and a spoken language draw on to interact. It also discusses some limitations of the present research, mainly methodological issues, and suggests new avenues for future research that should be encouraged to view gesture and sign side-by-side.

Part I
Theoretical Framework

FOR EXPLORING GESTURE, SIGN, AND LANGUAGE

This first part provides the necessary theoretical foundations and tools to address the issue of gesture's place with respect to spoken and signed language interactions. This section highlights how different accounts of gesture have affected the way language has been construed. An account of the different positions as regards the place of gesture in language, and the resulting (diverging) conclusions are presented. I show how different theoretical frameworks in SpLs and SLs have pushed scholars to view gesture and sign on different grounds and how this, as a result, has affected language theory. Reviewing those scholars' positions, I develop counter arguments in the light of other researchers' analyses, which actually explore and treat gesture and sign side by side in order to better account for the multiple and diverse ways speakers and signers organize their talk-in-interaction through bodily actions in each modality. The main argument throughout this chapter is that language is not only static but also dynamic, and inherently multimodal by definition.

This chapter demonstrates through various studies how the body can be a locus for meaning in interaction that includes all kinds of visible bodily actions, available at all times for the speaker's and signer's interpretation (Goodwin, 2007; Kendon, 2008; Shaw, 2019), and that these visible units of meaning are deeply integrated with language, regardless of modality. This chapter first introduces various studies that have addressed gestural aspects of SLs. Then, in order to frame the current position, this chapter returns to a core definition of gesture, its forms and its functions as they have traditionally been tackled in the field of SpL research. Following that, I narrow down the focus to aspects of gesture as explored in the current dissertation by presenting gesture's definition and its interactive roles in social interaction. Thus, works investigating the social and dialogic dimensions of gesture in spoken conversations are reviewed. This paves the way toward a review of diverse studies focusing on certain aspects of signed talk as well, aspects that have largely been overlooked by SL researchers thus far. All in all, this chapter questions the place gesture has been assigned in spoken and signed languages, and demonstrates how a broader view of the term enables scholars to see language in a more unified way: as a multimodal phenomenon encompassing spoken and signed languages, which is best realized in situated contexts of face-to-face interaction.

CHAPTER 1
The Intertwined Stories of Gesture, Sign, and Language

While much of the progress scholars
have made in characterizing gesture [...] has been fruitful,
we have reached an impasse where the murkiness of gesture's relationship to language,
regardless of modality, must be tackled head-on
(Shaw, 2019, p. 14)

1 Conceptualizing the Problem

The present work is a direct comparison of the use of certain gestural features by signers and speakers in face-to-face discourse. The concept of gesture is blurry. While the word needs no explanation in itself – everyone has an idea of what a gesture is or does – gesture remains hard to define; it is omnipresent and yet, it existed as an unnoticed by-product of the human language ability until linguists argued for its integration as part of language (McNeill, 1985). However, gesture integration as part and parcel of language is to be construed in terms of its tight bond with the concurrent speech. Yet, in considering gesture's link to language only half of the issue is represented by solely considering its forms and its functions in spoken conversation. It is a matter of seeing the glass as half full or half empty given the germane considerations of gesture in relation to sign languages as well. Sign and gesture share a long history (see Chap. 0). Still, making sense of gesture in sign and in spoken language interactions has turned out to be a thorny endeavor. On the one hand, for SL researchers, integrating gesture as part of SLs poses theoretical and analytical challenges as to how to explain gesture's nature against attested language systems like SLs. Therefore, a long-standing position toward gesture has been to differentiate it from sign. On the other hand, for researchers from the field of gesture studies, placing SLs within their frameworks has raised important concerns about expanding gesture's relation to language beyond speech.

In the current state of affairs, the ways researchers have approached this gesture-sign interface have led to different conclusions as regards the nature of this relationship. There are two opposite views of gesture and sign that exist: one that integrates gesture as part of sign language and one that differentiates gesture from it. While the former argues for exploring gesture and sign on common ground, the latter posits a divide between the two. As discussed in the following sections, the position that highlights discontinuities between gesture and sign (Goldin-Meadow & Brentari, 2017; McNeill, 1992, 2005) makes it harder to situate and account for the diverse and multiple ways humans, deaf and hearing, use their body to create and express meaningful composite utterances (Enfield, 2009) in their conversations.

Some of the reasons that prevent the side-by-side systematic comparison of gesture and sign in SpLs and SLs originate in part in the fact that these two competing views depart, in reality, from distinct initial conceptions as regards what gesture is and what gesture does in language (Andrén, 2014; Kendon, 2008; Müller, 2018; Shaw, 2019). Accordingly, to better understand the position advocated in the current framework, the different arguments for gesture-sign dynamics are discussed by first reviewing analyses that have explored gestural aspects in SLs. Starting with the investigation of gesture by SL researchers paves the way toward understanding the current paradigm that divides scholars into two distinct camps: those who emphasize the gap between gesture and sign *vs.* those who argue for their exploration side-by-side. Then, the ways the concept of gesture itself has traditionally been approached in the literature on gesture studies are addressed. Finally, how gesture is viewed and applied in the present work, which favors a study of gesture and sign on common ground, is introduced.

2 Gesture in Signing: Separating the wheat from the chaff

The intertwined histories of gesture and sign languages have primarily been prejudiced against by the supremacy granted to the study of spoken language (speech) as the central norm to language theories (Perniss, 2018), leaving out the investigation of gestural aspects of language in both, spoken and signed languages. Some major contributions to SL and gesture research have made inroads in this regard. These include early seminal publications regarding the status of gesture as part of language and its tight link with speech (Kendon, 2004; McNeill, 1992), and the recognition of SLs as legitimate linguistic systems (Stokoe, 1960). Therefore, the fact that gesture is recognized to play a central role in language by participating in the construction of spoken utterances, and that SLs are recognized as natural languages just as spoken languages guided the reflection that there should be no *a priori* reason to think that signers do not gesture. Yet, the question that remains pending is related to "how": how can signers integrate gesture into their signing stream provided that the same articulators for producing language in SLs are the same articulators used for gesturing? And thus, such a question has often implied that researchers deal with the larger issue of distinguishing the linguistic from the gestural, as Quinto-Pozos (2002) said: "how does one go about defining what is gestural and what is linguistic" in SLs (p. 169)? This type of questioning is what preoccupied scholars in the early treatments of gestural instantiations in SLs, as is described next.

2.1 Treatments of gestural aspects in signing

Early works investigating gestural aspects in SLs argued for a direct separation between gesture and sign, presenting them as two distinct and opposite entities (e.g., Duncan, 2003; Emmorey, 1999). This type of view argues that sign forms part of the linguistic while gesture is part of the paralinguistic, as outside of language (Kendon, 2008). Emmorey (1999) tackles this issue head on by asking "Do signers gesture?", and provides a number of reasons why sign and gesture should not be viewed as equivalents through the exploration of various properties found in ASL but absent from co-speech gestures, and the other way around. Striking, though, is her claim to provide an answer to a major – more pressing – issue: what makes SL different from gesture? Emmorey (1999) states that only "a review of significant differences between

SL and gesture provides an important backdrop for investigating whether and how gestures might accompany sign" (p. 133). She concludes by recognizing that signers do gesture but they do it in a different way than speakers do.

According to Emmorey (1999), signers do not produce spontaneous idiosyncratic manual gestures that co-occur simultaneously with signing as speakers produce gestures concurrent with their speech. The reason why Emmorey reaches such a conclusion is reflected through the position that she takes regarding her view of gesture. It is possible to link her position with two aspects. First, her position is grounded in the fact that she identifies the SL "sign" as linguistic on a par with the lexical items in SpL. As Kendon (2008) argues, "it is claimed that such items are composed of discrete, re-combinable units" (p. 349), which, according to Emmorey's (1999) definition, a (manual) gesture is not. This leads to the second part of her conclusion. Her view of gesture is one that is deeply rooted in McNeill's (1992) view of gesture. She takes as a starting point the McNeillian sense of gesture, which is deeply rooted in the cognitive and psychological processes of the human mind. Therefore, such an assessment of gesture, as will be discussed, implies that only the (manual) spontaneous, idiosyncratic gestures that are capable of revealing the imagistic nature of thought are considered gesture proper. These gestures are holistic expressions that are constructed regardless of "any standards of form, there is no lexical repertoire for them", as stated by Kendon (2008, p. 349). What this conception means, reveals, and implies for scholars exploring gesture's relation to sign is that yes, gesture is different from sign in that sense. It will be examined further, however, how such a position, in reality, impedes the full treatment of gesture in relation to sign in both, spoken and signed languages.

While Emmorey (1999) states that signers do not gesture like speakers do where manual gestures are concerned, she nevertheless points out that signers can integrate gestures into their signing stream. To do so, however, either signers stop signing, thus, gesture and sign are performed sequentially; or the gesture part moves away from the hands to be articulated by facial expressions or other body parts such as the signer's mouth. Then, the gesture co-occurs with the manual (linguistic) sign (e.g., when the signer sticks out their tongue with a fearful expression while signing DOG RUNS; as cited in Goldin-Meadow & Brentari, 2017, p. 12). To illustrate the first case scenario, Emmorey shows how signers make use of demonstrative gestures (viz., conventional gestures known as emblems) in alternation with signs to report the actions of others. Clark and Gerrig (1990) have highlighted these types of gestures as used by speakers for the demonstration of quoted actions in spoken language as well, and Liddell and Metzger (1998) have explored these enactments as constructed actions in ASL. As a case in point in ASL, Emmorey comments on how a signer, when retelling an episode from the story *Frog, where are you?*, enacts the perspective of a boy through the use of a series of conventional gestures to report what the boy is saying to the dog, such as the *shh*, "be quiet", emblem.

What is very enlightening in reading Emmorey's (1999) approach, though, is that while she strongly posits a distinction between gesture and sign, she acknowledges at the same time that signers may use interactive gestures as they are defined by Bavelas and colleagues (1992, 1995). A definition that corresponds to the current definition of interactive gestures developed in the current framework as well. Emmorey (1999) writes:

> Further research may reveal other types of manual and body gestures. In particular, it seems likely that signers produce interactive gestures during conversations. Bavelas and her colleagues describe a type of gesture, which makes reference to the interlocutor, rather than the topic of the discourse (p. 155).

She makes a further appeal for future studies to investigate other interactive gestures as they are used by signers, suggesting eye gaze and head moves as two strong candidates for carrying similar interactive functions as those described for the manual gestures in spoken language by Bavelas and colleagues (1992). Thus, while the possibility for signers to make use of interactive gesture is raised, the likelihood for it to occur with the hands is not mentioned but it is instead suggested that such interactive gestures move to other (non-manual) articulators. In the present study, Emmorey's (1999) claim that interactive gestures move away from the hands in signing is not corroborated. Rather, the current study presents evidence that by examining gesture and sign side-by-side, the social, interactive nature of gestures can be unveiled both in speakers' and in signers' manual gestures.

In a similar vein to Emmorey (1999), Sandler (2009) also demonstrated that signers' channel for expressing gestural content may move away from the hands. She demonstrates that signers can use their mouth to express the gestural aspects of certain discourse parts, and that these mouth gestures resemble the representational hand gestures found in speakers' discourse. Nevertheless, contrary to Emmorey, Sandler shows that the gestural content, expressed by the non-manual articulator (the mouth), co-occurs with the linguistic content conveyed by the manual articulators (the hands), just as is the case in speakers' use of co-speech gestures (speech represents the linguistic part of the message that co-occurs with the representational gestures). This view suggests once again that what is expressed with the hands in SL is linguistic whereas that which is expressed with the mouth is gestural and thus, paralinguistic. This further fosters a view of gesture as outside of language. The SL analyzed in Sandler's study is Israeli SL (ISL) and four signers are asked to retell an episode of the *Sylvester and Tweety Bird* cartoon. Like Emmorey, Sandler's analysis is based on narrative tasks. However, these types of tasks fail to properly describe what individuals, signers and speakers, do in language when they interact in spontaneous conversations. This is also a decisive aspect that needs to be reckoned with when addressing the nature of the relationship between gesture and sign in SLs and SpLs. Only gesture as explored in its home habitat, whose ecological niche is claimed to be face-to-face contexts of interaction (Perniss, 2018; Schegloff, 1996), in signed and spoken conversations, can allow for a proper discussion of gesture in relation to sign be undetaken.

To return to Sandler's (2009) example, ISL signers produce mouth gestures "**to embellish** [emphasis added] the linguistic descriptions they g[i]ve with their hands" (Goldin-Meadow & Brentari, 2017, p. 12). One signer, when explaining with his hands how Sylvester (the cat) is going through a long, narrow drainpipe (using a small-animal classifier moving upward in a zigzag manner), tightens his mouth to express the narrow nature of the drainpipe and the constricted aspect of Sylvester's climb. Although the mouth is physically more constrained than the hands to convey iconicity, Sandler's findings concur with what has been described in SpLs regarding the (iconic) gestural aspects of the mouth described for representational hand gestures (McNeill, 1992). Here, the combination of the manual (linguistic) and the non-manual (gestural) components convey that Sylvester is going through a narrow drainpipe. What the mouth reveals here is the imagistic, global, instantaneous and idiosyncratic aspect of gesture usually attributed to the hands, therefore adopting a McNeillian (1992) view toward gesture. Moreover, the mouth gestures as used by the ISL signers are described as embellishing items that support the linguistic content conveyed by the hands in SLs (see Goldin-Meadow & Brentari's 2017, p. 12, quote mentioned at the beginning of the present paragraph). Goldin-Meadow and Brentari's (2017) words resonate with a position toward gestures that portray them as pure paralinguistic add-ons, as if they were mere decorative ornaments that only assist the hands, which assume the full linguistic weight of producing language. Such a view of gesture reduces the scope of gesture's roles and its position as regards sign and language. In this chapter, a wider view of gesture as well as its roles in signed and spoken language is adopted.

Duncan (2005) also argues that there is gesture in signing, but finds that signers can use manual (their hands) and non-manual (their mouth) articulators to produce gesture as speakers do. Her study integrates Emmorey's (1999) and Sandler's (2009) claims to some extent. Duncan conducted a small-scale study on Taiwanese Sign Language (TSL) using the *Sylvester and Tweety Bird* cartoon as an elicitation task for nine adult native signers of TSL. Her findings suggest that signers do produce manual gestures in alternation with signs (as also found in Emmorey, 1999), but there was co-occurring "manual production of iconic gestures" (Duncan, 2005, p. 281). One signer, for instance, enacted the climbing sequence (hence, the manner of motion) of Sylvester (the cat) on the outside of the drainpipe by making a gesture interspersed with the sign for CLIMB-UP, which corresponds to a thumb-and-pinky classifier handshape upward, used for animals in TSL. Duncan added that the TSL participants reported, after the experiment, that thumb-and-pinky was often used to refer to long, narrow objects in classifier constructions, therefore, possibly denoting Sylvester's constricted position within the drainpipe.

In other terms, this implies that in reporting the cartoon scene displaying Sylvester's difficult climb up the drainpipe, the signer describes the event "in intervals of signing interspersed with intervals of constructed actions" (Duncan, 2005, p. 301). In addition, three TSL signers also articulated idiosyncratic hand gestures in co-occurrence with their signing by modifying the handshape of their signing to describe the cat's climb inside (*vs*. outside) the drainpipe. Duncan reports how the three signers differed in the modification of their handshape through the use of another TSL classifier for animals, a three-fingered handshape (see Figs. 6a, 6b, and 7 in Duncan, 2005, pp. 303-304). When soliciting different finger configurations of this classifier, each participant created a depictive representation of Sylvester's confined situation inside the drainpipe, thus highlighting that signers are able to produce spontaneous, idiosyncratic manual gestures occurring simultaneously with the concurrent manual signs. If the three signers had modified their handshape of the classifier similarly, then these examples would have been construed as evidence of morphemic (hence, linguistic) elements rather than gestural (Duncan, 2005). In other words, Duncan argues that the idiosyncratic modifications of the signers' hand configurations are gestural and not morphemic, and construes this variability across signers in the light of McNeill's (1992) account of gestural analysis, in that "gradient imagery is a source of meaning while not dictating specifics of forms" (Duncan, 2005, p. 308). These examples, according to Duncan, provide counter-arguments to the claim that others have made regarding the unlikely possibility for signers to produce such hand gestures concurrent with signs (e.g., Emmorey & Herzig, 2003).

By idiosyncratically modifying their handshapes, the TSL signers from Duncan's (2005) study created a representation of the cartoon event. An analogous process has been reported in SpL research. Okrent (2002) has further shown that hearing speakers (e.g., English and Mandarin Chinese speakers) can modify varying dimensions when uttering spoken words, including phenomena, such as pitch and syllable lengthening, for depictive purposes comparable to Duncan's analysis of TSL signers. For example, the vowels segments in the English phrase *it took so-o-o lo-o-ong* are lengthened to convey a gestural representation of time, revealing the speaker's feeling of an excessively long duration. Duncan with respect to this example claims that such "iconically depictive modifications of categorical speech forms are accomplished with no decrement to the comprehensibility of the speech forms themselves" (p. 286).

Duncan's (2005) study falls within the growing body of research devoted to the analysis of a variety of gestural patterning in SL use (Liddell & Metzger, 1998; Liddell, 2003a, 2003b; Emmorey, 1999; Emmorey & Herzig, 2003; Schembri et al., 2005). Handshape is not the only parameter that has constituted grounds for gesture-like patterning in SLs: modifications of location and motion are two other parameters that have attracted the attention of scholars investigating the presence of gesture in signing.

2.2 Shifts in treatments of gestural aspects in signing

In the last two decades, a shift in the ways SL researchers have treated specific instantiations of gestural phenomena in SLs has taken place. This shift can be interpreted in the light of the historical developments that have tainted the history of SLs. As already mentioned, in the middle of the twentieth century, the primary impetus characterizing the study of SLs was to prove they were as complex in their linguistic anatomy as spoken languages were. Therefore, SLs were examined from a particular linguistic perspective drawn from structuralist linguistic models developed for SpLs (see Kendon, 2008, for a comprehensive review). From these early works, basic linguistic properties common to spoken and signed language structures were identified on the levels of syntax, morphology, and phonology. Yet, later on, scholars began to investigate and realize that there were other ways that signers made use of their language and expressed themselves, ways that failed to be explained purely in terms of a structuralist linguistic model. These modality-independent characteristics included, for instance, the use of space in pronouns and indicating "agreement" verbs (Emmorey, 2002; Liddell, 2003b; Liddell & Metzger, 1998), or depicting constructions (also called classifiers, classifier constructions, or polycomponential verbs; see Schembri, 2003, for terminological clarifications) (Cormier et al., 2012; Duncan, 2005; Hodge & Johnston, 2014; Lu & Goldin-Meadow, 2018; Schembri et al., 2005). These components of SLs have raised doubts about whether they could instead be analyzed through the lens of gestural components in SLs or as a combination of both, gestural and linguistic elements.

This is the case, for example, for indicating (agreement) verbs (Liddell, 2003b; Liddell & Metzger, 1998). In ASL, this class of verbs encompasses glosses such as GIVE, LOOK, and ASK where the movements of the hands with the appropriate hand configuration and orientation "indicate from whom the action derives and to whom the action is aimed" (Shaw, 2019, p. 20). In these cases, Liddell (2003b) suggests that these verbs are not simultaneously combined only with morphemic aspect, but also with pointing gestures. More particularly, it is argued that the location and movement are gestural (viz., analogical and gradient) while the handshape is viewed as morphemic (viz., discrete and categorical), since such verbs can exploit an infinite number of addressable locations and movements while the handshape remains finite or listable. For Liddell, the gestural use of location and movement in those signs resembles how speakers deploy certain representational gestures to indicate location and movement; these components, writes Özyürek (2012), "are derived from imagery as in McNeill's theory of speech and gesture" (p. 638). Thus, one area where the gradient and the linguistic meet, for Liddell, is in the signer's use of space.

Another type of construction that has been revealed to incorporate gestural components is the depicting/classifier construction. In these constructions, the handshape is also claimed to be categorical but movement is arguably gestural (gradient) (Emmorey & Herzig, 2003; Liddell, 2003a; Schembri, 2003; but see Supalla, 2003, for a different take on the issue). Lu and Goldin-Meadow (2018) claim that the gestural aspect of these depicting constructions "makes these forms highly productive; signers can combine multiple components and manipulate them gradiently in space in a seemingly infinite number of ways" (n.p.). Interestingly, this contrasts with Emmorey's (1999) study where signers alternate gesture and sign. Here, the morphemic aspect of the sign (reflected in the handshape) is simultaneously combined with gradient gestural aspects (reflected in the location and movement), which are not only articulated at the same time but also with the same body articulator: the signer's hand(s).

Liddell's (2003a) arguments were examined in a study by Shembri et al. (2005). The authors explored the use of classifier constructions by signers for expressing motion events in three historically unrelated SLs, namely, ASL, TSL, and Auslan, and compared the results with the gestures performed by hearing English non-signers describing the same motion events. An important precision, though, regarding the design of the study is that the speakers were constrained into using their hands only without being allowed to speak. Schembri and colleagues observed the following dimensions: handshape, motion, and place of articulation. They found out that signers of all three SLs used the last two components (motion and place of articulation) in a similar fashion to describe the motion events (e.g., a linear path to describe a forward motion along a path). Motion and location units were not only similar across signers of the three unrelated SLs but they were also the same in the silent gestures articulated by the hearing non-signing speakers. In contrast, the handshape was similar among signers within the same SL but different from the other SLs and from the silent gestures as well. In other words, hearing speakers, when prevented from speaking and asked to solely gesture to communicate, produced gestures that resembled the signs that signers performed regarding motion and location parameters, but not handshape. Thus, while motion and location units for the description of events displayed systematicity across signers and speakers, variability in handshape was established for different spoken and signed languages.

According to Schembri et al. (2005), these results support Liddell's (2003a) claim concerning the gradient-analog (gestural) aspect in the usage of signing space for expressing movement and location while the handshape belongs rather to the realm of the linguistic. According to Schembri and colleagues, such findings add supporting evidence with respect to the status of classifier constructions as "blends of gestural and linguistic elements" (p 287). These results are not only in keeping with Liddell's (2003a) work but with others' as well, such as Emmorey and Herzig (2003) who also reported that classifier handshapes were categorical (thus, linguistic).

However, as pointed out by Özyürek (2012), research should be conducted to directly compare signing and gesture (not silent gesture without speaking) as regards the usage of location and movement forms "in depictions of motion and action" (p. 639). Moreover, the various positions reviewed thus far only acknowledge and account for half of the issue. Most of the approaches presented here that examined the gradient-gestural aspect in language were primarily focusing on the most iconic characteristics of SL: on the depictive representations of gestures, viz., their imagistic nature (to quote McNeill's, 1992, term). A case in point illustrating this problematic position is found in the definition of gesture adopted by Schembri and colleagues (2005):

> The term gesture in this article refers to the broad range of iconic or mimetic gestures that may be created anew, can cooccur with speech (as gesticulation) or alone, and that can "depict concrete aspects of imagery with forms that look like the images they represent" (Okrent, 2002, p.182). It is these forms that share some properties with classifier verbs of motion in signed languages and that provide the impetus for the present study (p. 273).

Consequently, this type of approach to gesture only presents half of the picture, leaving out those gestures that do not depict imagery. As will be seen, this type of position is one of the factors that prevent from fully accounting for gesture's place with respect to sign and language.

2.3 Back to the origins of the divide

The last decades have witnessed the rise in the number of linguists who, slowly but increasingly, have become more willing to accept that gesture is present in SLs. SL scholars have illustrated different possibilities for gesture manifestation in signing (Duncan, 2005; Emmorey, 1999; Liddell, 2003a, 2003b; Sandler, 2009; Schembri, et al., 2005). While researchers have acknowledged that gesture plays a role in SL, there remains constraints concerning the ways signers deploy gesture in signing, ways that somehow maintain a gap between gesture and sign. Some of the ways reviewed earlier indicated that signers either have to stop signing to gesture (gesture and sign are produced sequentially), that gesture moves away from the hands (e.g., gesture goes to the signer's mouth), and that gestural and linguistic components are blended into the linguistic anatomy of the sign. Furthermore, speakers prevented from speaking were found to perform silent gestures whose forms resemble the signs that signers produce.

Part of the explanation to account for these distinctions between gesture and sign maintained by scholars goes back to the prevailing models for linguistic enquiry in vogue during the last decades of the twentieth century. As mentioned, the ways gesture and gesture-like aspects have received attention in SLs have been strongly influenced by models inherited from the prevailing structuralist approach to language, primarily devoted to the linguistic analysis of spoken language structures. Therefore, SL linguists modeled their investigation of SL phenomena following and adopting SpL principles of linguistic analysis[3]. Yet, other events have participated in reinforcing the barrier

[3] Kendon (2008) adds to this note that scholars "who were drawn to the study of sign language had mostly acquired their knowledge of linguistics following the impact of Chomsky's work on the field" (p. 356).

standing between gesture and sign, and account for why gesture has been explored as such in SLs. This part of the issue, as perfectly contained in Schembri and colleagues' (2005) definition of gesture, has influenced other researcher's view toward gesture.

Thus, the divide observed between gesture and sign is also the result of a strongly advocated model that situates gesture within the realm of a cognitive-psychological view of the term, which emerged in the latter half of the twentieth century (see Kendon, 2008). Many of the studies mentioned previously adopt as their point of departure a definition of gesture that is strongly associated with McNeill's (1992, 2005) point of view, an approach that has tended to exacerbate the differences between gesture and sign by presenting manual forms on a continuum (McNeill, 1992) or a set of continua (McNeill, 2005). Hence, in keeping with McNeill's (1992, 2005) approach, those researchers have mainly dealt with the idiosyncratic units depicting imagery, the deictic and the iconic forms of language. As highlighted by Shaw (2019), one outcome of considering gesture as such is that "only a small set of discourse features - mainly depicting constructions, constructed action, and referential use of space - are eligible instantiations of gesture in sign language" (p. 4). This type of vision reduces and limits the range of other gestural forms that signers resort to in their discourse, including the interactive use of gesture. Although mentioned in passing in several studies (e.g., Emmorey, 1999; Özyürek, 2012), the interactive gestures that signers could use would still be relegated, according to Emmorey (1999), to non-manual articulators such as eye gaze and head moves, which would constitute perfect candidates to welcome these functions, but not the hands. Alternatively, the interactive functions of hand gestures in the study of SpLs have been labeled as belonging to the realm of gesture proper (Bavelas et al., 1992, 1995).

Gesture is a kaleidoscopic behavior. It embodies multiple forms (viz., types) and functions that are subject to change as the conditions characterizing different contexts of talk vary according to one factor or another. For instance, participants recorded during narrative tasks in a lab setting, as seen in the previous studies, produce gestures differently than those whose gestures are performed in more natural and spontaneous environments, in their home, or during conversations with family and friends or even co-workers. There is a myriad of possibilities for gesture to emerge as part of people's conversations and discourses, which include interactive roles. As a result, focusing only on the imagistic nature of gesture and not its interactive dimension, as reflected in the previous account of gesture in signing and speaking, only brings to light an incomplete picture of gesture's roles in language.

In order to properly address and ground the question of gesture *in* language use, it is mandatory to return to the concept of gesture in favor of a more encompassing view of the term. Additionally, it is equally as important to revisit what is usually attributed as pertaining to the fold of language (Kendon, 2008). Language is not used only to express propositional (referential) utterance content. Neither is gesture. Hence, the line between what is linguistic and what is not needs to be reevaluated and changed accordingly to fully acknowledge what individuals, signers and speakers, *do* in language to express meaning (Shaw, 2013, 2019), which also includes the body. The position in this dissertation considers the human language ability as fundamentally complex and multimodal, and argues for exploring gesture and sign hand in hand to uncover hidden overlaps that have been overlooked as a result of structuralist linguistics, on the one hand, and prevailing psycholinguistic and cognitive models of gesture, on the other (Kendon, 2008). As a means to fully understand the approach to gesture in the current framework, as part of spoken and signed language use, a stroll through the lanes of the views on gesture in SpL research is necessary.

3 Gesture in Speaking: Integrating Gesture and Speech

The earlier work conducted on gesture in signing mentioned in the previous section presents an overview of the gesture-sign issue from the perspective of SLs. It is now time to examine how the treatment of gesture in spoken languages has, in fact, also affected the way this gesture-sign dialectic has been approached by scholars in the field of gesture studies, on the one hand, but also, as mentioned, among SL scholars, on the other (e.g., Schembri et al.'s (2005) study).

Before delving into the nature of the issue, looking back on the history of gesture analysis, it is important to mention that gestures have been considered the black sheep of linguistics, unworthy of scholarly attention before coming to an age during the last decades of the twentieth century. The dominant assumption prior to that time was that gesture belonged to non-verbal communication, which clearly and fundamentally placed gesture on the margins of language (see Kendon, 2004; McNeill, 1992; Müller et al., 2013 for a review of this historical period).

The heart of the issue with respect to situating gesture in language on the side of SpLs is nicely put into words by Shaw (2019), who claims that "[t]he study of co-speech gesture [in SpLs] faces a different challenge [...] not parsing gesture from the linguistic code but integrating gesture into it" (p. 22). Establishing gesture's tight relationship with the concurrent speech is what has primarily motivated scholars in the field of gesture studies. The motivations lying behind this impetus is to establish gesture "as parts of language itself" (McNeill, 2005, p. 13). This shift from gesture outside language to gesture in language has consequently enabled the field to offer "new insights into the nature of speaking, thinking, remembering, and interacting" (McNeill, 2000, p. 9). Evidence supporting the view that speech and gestures are closely intertwined and form a unified system comes from production (Alibali et al., 2000; Goldin-Meadow, 2003a; Kita & Özyürek, 2003) and comprehension language studies (Kelly & Church 1998; Kelly et al., 1999).

McNeill's (2000, p. 9) quote above illustrates the ways researchers in gesture studies have explored the gesture-speech dialectic on different terms. As a matter of fact, scholars have adopted different positions with respect to gesture's forms and gesture's roles toward speech (language), which, in turn, have entailed these researchers taking on different views toward the nature of gesture's relationship with language, including the debate of the gesture-sign relationship as well.

3.1 Different views, different approaches, different conclusions

Several researchers have influenced the field of contemporary gesture studies. In particular, four leading (opposite, yet complementary) positions have recently made a claim for gesture's position in language. On the one hand, McNeill (1992) along with Goldin-Meadow and Brentari (2017) view gesture as deeply rooted in a psycholinguistic and cognitive model of language, whereas Kendon (2004, 2008) as well as Müller (2018) view gesture as grounded in a functional and communicative approach to gesture in language. Although all four researchers are interested in the manifestation of gesture in language, they all reach different conclusions with respect to how this is achieved and the place gesture occupies in language. Thus, while Golding-Meadow and Brentari (2017) argue that Kendon's (2004, 2008) approach "runs the risk of blurring distinctions among different uses of the body, or treating all distinctions as equally important" (p. 2), Kendon (2008) states that emphasizing differences has "obscure[d] areas of overlap" (p. 348). It may therefore become difficult for any researcher to know where to stand between these two claims. The aim of the following subsections is to unveil the conceptions at work behind these two opposite views of gesture and sign, and how returning to a core definition of gesture (and language) ultimately sheds light on the issue.

3.1.1 Gesture *as a window into the mind* of speakers (McNeill)

It can be stated that McNeill's (1992, 2005) theory is primarily concerned with the microgenesis of utterance formation as it unfolds in the speaker's mind or else as a window into the speaker's mind to echo his words. In McNeill's (1992) cognitive view, gesture and speech initially originate in a single unit, which he labels as the "Growth Point (GP)"[4], a sort of underlying cognitive apparatus. McNeill (1992) puts forward this theory of a GP given the evidence of a strongly marked temporal synchrony observed between gesture and speech. He reports that gesture (to be construed in the sense of singular gestures or gesticulation) aligns temporally with the linguistic segment conveyed in speech. An example of this gesture-speech integration is when a speaker describes a cartoon scene and says: "and he [bends it way back]", in which the executed movement is the same as what is spoken (McNeill, 1992, p. 12). This argument of temporal synchrony suggests that the same meaning is conveyed in both modalities at once. According to McNeill (1992), this represents sufficient evidence to state that "having a shared meaning could be the basis for integrating gesture and speech into a single performance" (p. 24).

This GP is composed of two "opposite semiotic modes of meaning" (McNeill, 2005, p. 32), each capturing different aspects of thought: imagery embodied as gesture and the linguistic properties of speech. Gesture, for McNeill (2005), is global, synthetic, instantaneous and non-combinatoric while speech (language) is segmented, arbitrary, and conventional. Yet, these two modes are, as Müller (2018) highlights, "indispensable because their categorical difference drives thinking as people are speaking" (p. 3). The outcome of this gesture-speech dialectic is the final form of utterance.

An important part of McNeill's (1992) theory relies on Kendon's Continuum, which he later reassessed in 2005. The initial continuum provides an ordering of gesture from the least linguistic (gesticulation) to the most linguistic forms (sign language) (see Fig. 1). According to these psychological and cognitive views, only singular gestures, "gesticulation" as Kendon (2004) once labeled it (referring mostly to

[4] See Kita and Özyürek's (2003) study on comparing English *vs.* Turkish *vs.* Japanese speakers' gestures for a different position. The authors claim that gesture and speech are derived from different representations (gesture from imagistic representations *vs.* speech/language from propositional representations). Accordingly, both interact during the production process.

representational gestures), that co-occur with speech, that are created on the spot, and are capable of revealing the imagistic aspects of thought, are of interest. McNeill is only interested in gesticulation, for which he establishes a distinction between four gesture types, namely, metaphorics, deictics, iconics and beats[5].

- ❖ **Metaphoric gestures** do not only describe concrete events, but they also depict abstract content. A case in point is when "a speaker appears to be holding an object, as if presenting it, yet the meaning is not presenting an object but an 'idea' or 'memory'" (McNeill, 1985, p. 356).
- ❖ **Deictic gestures** point to present or absent referents. The typical deictic gesture being an extended index finger, although almost any extensible body parts such as the head and lips can be used to point as well. It has been observed, however, that in daily adult interactions, the typical deictic gesture is not so much physical pointing but rather abstract pointing.
- ❖ **Iconic gestures** – or representational gestures – "depict the properties of some object or action" (Cocks et al., 2011, p. 26), which is mentioned in the congruent speech as well. The information conveyed verbally is the same as that performed in the gesture.
- ❖ **Beats** mark the structure of discourse. They may be said to function as a "gestural yellow highlighter" (McNeill, 2006, p. 301) emphasizing sequences of speech such as words and phrases on which the speaker wishes to lay stress. They also mark the coherence of the discourse. Thus, although they may at first sight appear to be the least noticeable moves in an interaction as they are strictly linked to speech, they also serve a discursive function in that they highlight and accentuate certain linguistic units.

Gesticulation is found on the extreme left side of the continuum:

Gesticulation >> Pantomime >> Emblems >> Sign Language

Fig. 1: Kendon's Continuum (McNeill, 1992, p. 37).

Gesticulation as created by speakers unconsciously exhibits their thoughts. These gestures are part of "the inside [world] of memory, thought and mental images" (McNeill, 1992, p. 12). Pantomimes can be performed without speech. The hands depict objects of actions such as hammering a nail. Emblems have "standards of well-formedness, a language-like property that gesticulation and pantomimes lack" (McNeill, 1992, p. 38). For example, a *thumbs-up* gesture for the OK sign. Emblems are also usually associated with gestures such as the *mano a borsa* (Kendon, 2004). Sign languages are put at the other end and are defined by McNeill (1992) as "full-fledged linguistic systems with segmentation, compositionality, a lexicon, a syntax,

[5] When addressing the different types of gestures, it is important to acknowledge that various researchers have proposed different classifications (see Kendon, 2004 for a more encompassing discussion of the different typologies)

distinctiveness, arbitrariness, standards of well-formedness, and a community of users" (p. 38).

In this initial conception of the continuum, two types of changes take place when moving from left to right. First, the obligatory presence of speech in gesticulation gradually fades away and second, a conventional system analogous to language emerges in SLs. In other words, "the degree to which a gesture shows the properties of a language increases. Gesticulations are obligatorily accompanied by speech but have properties unlike language"; signs, on the other end of the continuum, "are obligatorily not accompanied by speech and have the essential properties of a language" (McNeill, 2009, p. 518).

Later, McNeill (2005) realized the necessity to consider the concept of gesture and revised the continuum with respect to the following four distinct aspects: (1) how they relate to speech, (2) their link to linguistic properties, (3) conventions, and (4) semiotic properties (see Müller, 2018, Fig. 5. for an adaptation of McNeill's continua and an overview of the different modifications along the continuum).

Despite the changes made, there are some issues with this conception of gestural categories placed on a continuum. The paradoxical problem with McNeill (1992) is that he approaches gesture categories on a continuum but instead of highlighting dynamic continuities between them, he uses the continuum to install a divide between the categories. As Müller (2018) points out:

> While at first sight this contradiction might not seem obvious, it is what McNeill's reflections on the different 'gesture-sign continua' come to conclude. In fact, based on the discussion of a potential continuum between gesture and sign, McNeill diagnoses a categorical difference between the two, a difference termed 'cataclysmic break' in a co-authored paper by Singleton, Goldin-Meadow and McNeill in 1995. (p. 6)

This position of gesture as different from language is to be construed in the light of his exclusive focus on a restricted set of gestural phenomena, viz., gesticulation. His conceptualization of gesture is deeply embedded in a perspective that focuses merely on where gesture originates: in the mind of speakers. By approaching gesture from such an internal, mental perspective, as deeply rooted in the inner cognitive and psychological functioning of the human mind, McNeill (1992, 2005) therefore grounds gesture as further away from the environment in which it unfolds and to whom it is addressed, that is, in language as used by speakers (and signers) with addressees.

This type of conceptualization is logical and makes sense when the goals of their studies are to observe singular gestures elicited under experimental conditions, for instance. For McNeill (2005), the continua remain vital for defining the singular gestures under the scope of his GP theory. As a result, however, the range of gestural forms is tremendously reduced. The functioning of other kinds of gestural phenomena cannot be unveiled given that they are already considered to be outside the scope of interest in these studies.

Additionally, this type of approach neglects the material, practical side of gesture (Streeck, 2009) and its functions in social interaction as well. In fact, a conceptualization of gesture as mental images as if they were inner thoughts fails to address one of the (many) other prevailing roles of gesture in language use: their role in face-to-face interaction. Moreover, this kind of dialectic fails to properly discuss gesture's relation with sign. McNeill's (1992, 2005) theory of a continuum (or continua) presents challenges concerning the study of sign language as well. Putting *gesticulation* on one end of the continuum *vs*. a whole complete linguistic system, *sign language,* (and not signs) on the other end, with intermediate separate and isolated gestural categories, has resulted in a complicated endeavor for researchers to integrate and address gestural aspects in SLs, beyond the McNeillian vision of it.

As argued by Shaw (2019), this division "has oversimplified the diverse sorts of [...] forms that exist in signed languages and, by extension, has constrained analysts in their typological classification of gestures in sign language" (p. 25). This is, to some extent, what has been witnessed in reviewing the various studies presented in section 2 of this chapter where most approaches (e.g., Emmorey, 1999; Liddell & Metzger, 1998; Schembri et al., 2005) take McNeill's vision of (singular) gestures as a point of departure to explore gestural aspects in SLs. It is true that relying on McNeill's vision to situate gesture as part of Kendon's Continuum (or continua) where SL is placed on the rightmost end of the continuum and acts "as the exemplar of linguistic systematization of gesture" (Shaw, 2019, p. 4) seems appropriate at first sight. There are studies reporting the existence of silent gestures (see 3.1.2 below), that is, gestures produced by speakers without speech, which become like signs that signers produce in SL systems.

There are a few problems in this approach to gesture. One is that speech is excluded from the equation. Yet, in order to adequately compare gesture to sign in signing, it is mandatory to examine gesture along with speech in SpLs, and conduct systematic comparisons of the two with respect to sign in SLs, as Vermeerbergen and Demey (2007) have strongly recommended. Moreover, another problem with silent gestures and a view of gesture along a continuum as separate from the rest of the categories is that only a restricted set of phenomena are taken into account and are considered as eligible candidates for comparable constructions in SLs (as is the case in Liddell, 2003a, 2003b). While this remains valid under certain circumstances (e.g., Goldin-Meadow & Brentari, 2017), there is a whole side of the story that is being entirely left out of the picture. By restricting gesture to one end of the continuum and sign language to the other, how users of SLs resort to a broader range of bodily behaviors to pragmatically manage their interaction along with the negotiation of the moment-by-moment relationship with their addressee(s) during face-to-face conversations is excluded right from the beginning.

Despite being insufficient, McNeill's (1992, 2005) theory and typology, including the continuum/continua, counts among the major contributions to the field of gesture studies, and has been very influential. Not only has it been borrowed by scholars from the field of SL studies but it keeps being used by scholars in the field of gesture studies, who refer to the McNeillian definition of gesture (1992) to strengthen their position in favor of a divide between gesture and sign. This is made particularly visible in the approach presented next.

3.1.2 Gesture and sign on a *cataclysmic break*[6] (Goldin-Meadow & Brentari)

Drawing on McNeill's (1992, 2005) theory of gesture, Goldin-Meadow and Brentari (2017) reinforce the claim that a divide between sign and gesture is mandatory to account for certain phenomena that are dependent on this distinction. Their position is grounded in McNeill's (1992) framework in that the authors also focus on spontaneous singular gestures, therefore, limiting their scope of gestural forms (and contexts) to explore. The divide does not leave space for other kinds of gestural forms to emerge as often in the discourse of speakers as in that of signers. A case in point would be the reduced Index Finger-Extended Gestures found in the discourse of LSFB signers (see Chap. 4, section 5.3) but also in the conversations of BF speakers. This kind of hybrid gestural form at the gesture-sign interface is hidden from adopting such a McNeillian perspective upon gesture as claimed by McNeill (1992) himself, and Goldin-Meadow and Brentari here. What matters to these researchers is primarily the impact gesture has on the learning prospects of speakers (to predict certain types of learning with gestures). But also the extent to which speech takes on gestural properties, revealing in this way that speech is not only categorical (speakers vary their acoustic speech properties, as seen in Okrent, 2002), and that gestures can take on properties of sign (as observed in silent gesturers).

To understand why the authors are in favor of maintaining a divide between gesture and sign, part of their argument stems from experimental evidence where speakers have to narrate events with and without speech. When hearing speakers are prevented from resorting to speech to communicate and are only allowed to gesture, the gestures that are created on the spot become more like signs, adopting language-like properties. In other words, they look more "discrete in form, with gestures forming segmented word-like units that [are] concatenated into strings characterized by consistent (non-English) order" (Goldin-Meadow & Brentari, 2017, p. 9). Goldin-Meadow and Brentari (2017) argue that these changes occur instantly in speakers and that there is a "qualitative difference" (p. 9) between the hand gestures when they are produced along with speech *vs.* when they are deployed to carry the full weight of putting the communicative message across (without speech). Moreover, the authors further their claim by insisting that such silent gestures (or as they call them "spontaneous signs"; Goldin-Meadow and Brentari, 2017, p. 9) also emerge in non-experimental settings.

Goldin-Meadow and Brentari (2017) mention a few studies that have found silent gestures among Christian monastic orders where silence has been imposed upon the community as well as in sawmills where noise prevents workers from communicating using speech, and, who, therefore, use spontaneous signs to communicate. However, these gestures do not match the reality of gestures in real-life uses and contexts. Put differently, the gestures as produced by Christian monks or sawmill workers are not spontaneous, idiosyncratic gestures created on the spot. Rather, these gestural forms are the result of some sort of convention established within the community of individuals, part of the monastery or the sawmill. As emphasized by Müller (2018), these gestures "have evolved over time and have developed conventionalized repertoires of fixed form-meaning pairings" (p. 11). Moreover, it can be argued that the gestures occurring in these kinds of communities only occur within the strict usage

[6] This is borrowed from Singleton et al.'s (1995) chapter title: "The cataclysmic break between gesticulation and sign: Evidence against a unified continuum of gestural communication."

of such communities, and not beyond them, meaning that such gestures, in reality, fail to resemble language because they are not like language at all, as it materializes in their natural habitat. They still take place within a limited and restricted context of production (monastery and sawmill, respectively), as if they were produced and elicited in an experiment and not in real-life exchanges in the real world of social interaction. Perhaps even, outside these restricted environments, it may be that these gestures are not comprehensible by another community of speakers. As a result, the meanings and forms of these silent gestures cannot be generalized either to a larger audience of users, or for more complex communicative purposes, nor across various naturalistic contexts (outside the restricted settings in which they occur), which make Goldin-Meadow and Brentari's (2017) claim of silent gestures, according to Müller (2018), as evidence for a divide between gesture and sign rather weak.

Another piece of evidence comes from experimental studies that focus on predictions about learning, and that such predictions can only be established if the divide between linguistic (speech and sign) and gestural (non-linguistic) forms is maintained. Goldin-Meadow and Brentari (2017) first demonstrate this by showing that learners who produce gesture-speech mismatches (viz., a discrepancy between the information conveyed in gesture *vs.* the information expressed in speech) in certain tasks are more apt to benefit from instruction than children who express the same piece of information in both modalities (Ping & Goldin-Meadow, 2008). According to Goldin-Meadow and Brentari, this type of experiment reveals perfectly the non-independent nature of gesture and speech, showing that they form an integrated system. They add that "this insight would be lost if gesture and speech were not analyzed as separate components of a single, integrated system; in other words, if they are not seen as contributing different types of information to a single, communicative act" (2017, p. 11). The same tendency has been established between gesture and sign (Goldin-Meadow et al., 2012) where an analysis of hand gestures performed by ASL deaf children when they explain their solution to a math problem reveals that those who produce gesture-sign mismatches profit from instruction. Thus, gesture-sign mismatches predict learning outcomes almost as comparably as gesture-speech mismatches in non-signing hearing children. The authors conclude that such results add supporting evidence for the integration of gesture and sign as part of a single cognitive system, just as gesture and speech, and that "taking a learner's gesture and sign, or a learner's gesture and speech, together allows us to predict the next steps that the learner will take" (Goldin-Meadow & Brentari, 2017, p. 14).

At the end of their paper, the authors suggest a strategy to help unveil similarities and differences between gestures as they are performed by speakers *vs.* signers by examining how gestures change when participants keep repeating the same discourse over and over again to an identical addressee. Goldin-Meadow and Brentari (2017) claim that such a comparison is illuminating in this kind of context because it is commonly assumed that speakers articulate fewer gestures "with talk that is becoming rote" (p. 16). If speakers produce fewer gestures over time, the various changes can be explored and be comparably observed in SL to see if SL remains as effective as speech when it is lacking its gestural components. Goldin-Meadow and Brentari claim that these kinds of comparisons in situations that elicit gesture to a greater or lesser degree "could give us an experimental handle on which aspects of sign are, in fact, gestural, and how those gestural aspects are comparable" (p. 16). This suggestion is once more so experimentally driven that it cuts off gesture from its true nature: as it unfolds in its home habitat (Schegloff, 1996), face-to-face interaction.

From the above-mentioned arguments, it can be concluded that these scholars' position stems from a strict reduction of the scope of gestural phenomena, that is, when determining the scope of their approach to gesture relevant for their framework, Goldin-Meadow and Brentari (2017) exclude other conventional and more hybrid gestural forms, as McNeill (1992) does. In other words, the exclusive focus on singular gestures precludes other kinds of gestures from emerging, and therefore, a coherent and realistic account of gesture in sign cannot be achieved. Additionally, all the authors' arguments are experimentally driven. They constantly resort to experimentally designed pieces of evidence to advance and ground the categorical divide between gesture and sign, rejecting possible continuities between the two. As a result, the origin of the divide witnessed thus far is twofold: it is the result of a conceptualization problem (how scholars come to define gesture) and it is caused by a restrictive experimental design that prevents other gestural forms from emerging, as they would in naturalistic language use.

Ultimately, Goldin-Meadow and Brentari's (2017) account fails to properly address major issues in gesture, sign, and language. Although their position (as well as McNeill's) of restricting the scope of gestural phenomena to gesticulation makes sense within their psychological and psycholinguistic framework of language, there remains a part of the gesture-sign storyline that is fundamentally missing and that is completely left out in their approaches. Indeed, all three fail to account for the commonalities of gesture and sign emerging when the full spectrum of gestural phenomena in their natural habitat is acknowledged. The remainder of this chapter is devoted to presenting and discussing this latter position in various researchers' frameworks that embrace the commonalities between gesture and sign for a full picture of language.

3.1.3 Gesture and sign: *there is a bridge across that gulf*[7] (Kendon)

McNeill (1992) and Goldin-Meadow and Brentari's (2017) position strikingly differs from Kendon's (2004, 2008) framework. Partly because Kendon's (2004) background is rooted in an anthropological and functional perspective toward gesture (or as he calls it: "visibly bodily action as utterance", 2004, p. 1), far from the psychological and cognitive underpinning of the human mind that McNeill, Goldin-Meadow and Brentari support.

To understand Kendon's (2008) position on gesture with respect to sign, it is first important (and relevant) to address the question of how gesture is viewed in relation to speech. As opposed to the cognitive take on gesture discussed in the previous two subsections, Kendon (2004) does not elaborate on the functioning of gesture and speech inside the mind of speakers. He is not so interested in finding out the inner, psychological processes of language involving gesture. Instead, Kendon (2004, 2008, 2018) promotes a functional and communicative approach to gesture (and language) as it results in the context of its production. In other words, he is more captivated by research prospects that take into account utterances as "finished products [...] in which an attempt is made to see how kinesic and spoken elements are deployed in relation to one another to create unified gesture-speech ensembles" (Kendon, 2008, p. 358).

[7] Borrowed from Kendon (1988): "I would like to suggest a different approach which, as I shall argue, can serve to link gesticulation with other kinds of gesturing, and which will also suggest that the gulf between presenting 'content' in gesture and presenting it in 'words' may not be as wide as it may now appear. At least I shall suggest a way in which a bridge may be built across that gulf" (p. 133).

Hence, gesture and speech work together – as a composite multimodal construction – in order to deliver the speaker's message to addressees. In this kind of approach (Clark, 1996; Kendon, 2004, 2008), all kinds of gesture are integrated into the scope of study, including fully conventionalized forms too: from gesticulation even to those involved in the creation of SL utterances. As a result, Kendon (2008) highlights the importance and relevance of setting aside the divide between gesture and sign in favor of viewing the two on common ground, which leads to a better understanding of how the two are related. Interestingly, the importance of foregrounding the commonalities was already put forward early on in his 1988 study, in which he states that:

> no sharp dividing line can be drawn between gesticulation that encodes meaning in a holistic fashion and gestures which, like so-called "emblems," are not shaped on the spur of the moment but follow an established form within a communication community, or which like the signs in a sign language, can be shown to be structured systematically out of recombineable elements (p. 134).

He builds his argument against differentiating gesture from sign by drawing on three aspects that shed light on how both are related: viz., through a historical, functional, and material treatment of gesture.

Firstly, in contrast to McNeill's (1992) view of singular gestures as being like thoughts, Kendon (1988, 2004) does not limit his analytical and theoretical scope of gestural forms to gesticulation only. Consequently, by encompassing a broader view of the concept of gesture (and language), including non-conventionalized and conventional gestural forms, Kendon (1988, 2004) demonstrates that there are dynamic (not static) connections emerging along the different gestural dimensions (from gesticulation to sign). In other words, the categories are not separated from each other but rather it is possible for gesture to change over time through a lexicalization process. Kendon (1988) has illustrated this process from gesticulation to emblems or highly conventionalized forms. For instance, he shows how emblems, also known as quotable gestures, have evolved and have acquired a stable form-meaning pairing status. They are conventional and have entered "into an explicit list or vocabulary" (Kendon, 2004, p. 335), they act as "the functional equivalent of a complete speech-act" (Kendon, 1988, p. 136), and come to be used alternatively to speech: they can be used to replace words. Examples of emblematic gestures include the *thumbs-up* or the *fingers crossed* gesture (see Teßendorf, 2013, pp. 82-100). In Kendon (1988, 2004), this historical continuity displayed between gesticulation and sign represents the premise of what later has been referred to as grammaticalization and lexicalization in SLs (Janzen, 2012; Pfau & Steinbach, 2006; van Loon et al., 2014).

One of the consequences of viewing the whole range of gestures and taking all gestural forms into account is the impact such a view has on the functions gestures are said to carry in discourse. While McNeill (1992, 2005), but also Goldin-Meadow and Brentari (2017), are mainly preoccupied with those gestures that act as representations of the propositional content of the utterance, mainly considered as hints about the inner underpinnings that govern speaking, Kendon (2018) also considers the pragmatic functions of gesture, along with the referential ones. In addition to the referential function, the pragmatic functions as established by Kendon are grouped into the following four categories: operational, modal, performative, and parsing or punctuational (pp. 167-168). These functions encompass gestures that work to confirm, deny, negate, frame, interpret, and structure parts of what is being uttered. Yet, to complete the picture, Kendon adds that a sixth functional group should be included. These are what he calls "interactional regulators" (p. 168), which belong to the functional category of gesture investigated in this framework under the name of "interactive gestures". Kendon already acknowledges that "gestures with these functions have not received a separate, systematic treatment, although, in various ways, other writers have recognised them" (p. 168). This gap in research about the social functions of gesture in SpLs and SLs is addressed in section 3.3, this chapter.

The second argument is that there exist functional commonalities between the gestures speakers produce and the words they utter. Thus, still considering the whole spectrum of gestural forms, Kendon (2018) shows that speakers engage in utterance constructions, in which their gestures act like spoken words. Concretely, Kendon provides an example, in which the combination of the information conveyed by the hand gestures and that presented in the content of the speaker's spoken words embody what Enfield (2009) calls "composite utterance" or as others have labeled "simultaneous construction" (Vermeerbergen & Demey, 2007), "multimodal grammatical integration" (Fricke, 2013), "multimodal utterance" (Ladewig, 2014), or "composite signal" (Clark, 1996).

To illustrate that speakers also construct multimodal composite utterances, Kendon (2014) provides the following example. A speaker is talking to his wife and a friend, and he is telling them about his father's grocery shop, and how the cheeses his father sold were packed upon arriving at the shop. The speaker raises both hands from rest position, palms facing one another, as if displaying the length and thickness of something before, in a second step, moving his hands in a linear way, with both index fingers extended, as if sketching the outline of an object (see Kendon, 2014, Fig. 1., p. 5). As the speaker performs this second gesture showing the size of the crates, he utters the following words: "and the cheeses used to come in big crates about as long as that", and referring to their shape says "An' they were shaped like a threepenny bit" (Kendon, 2018, p. 5). In his spoken words, the content refers to the length and the shape of the cheese crates while with his hand gestures the speaker depicts the length and shape of the object. In other terms, with his hands gestures, the speaker adds meaning to the utterance in a way that can be construed more precisely than with the spoken words alone. Like spoken words, gestural forms refer to concepts (e.g., length and depth). Functionally speaking, speech and gesture participate in the semantic construction of utterances to create complex meaning ensembles, and consequently, "the total meaning of what he is now saying is a product of an *interaction* between the meanings of his verbal phrases and the manually sketched illustrations that go with them" (Kendon, 2014, p. 5).

Finally, yet importantly, Kendon (2004, 2008, 2018) highlights aspects of gesture and sign by underlining material commonalities between the two in that he sees both, gesture and sign, as expressed through the same gestural medium (see Kendon, 2004, Chap. 15 pp. 307-325), or as he has pointed out, they are "cut from the same cloth"[8]. Technically, speakers have at their disposal the same anatomical elements as signers. Several instantiations of gestural expressions in speakers corresponding to the forms of expression found in SLs by Kendon (2004) were identified. For instance, he describes how speakers can also resort to using their gesture space available to them in a similar way to the way signers make use of signing space to establish surrogate

[8] Adam Kendon, pers. comm. to Jennifer Green, November 2007.

spaces (Liddell, 2003a). He writes: "Just as signers may set up, in Liddell's terms, surrogates for things that are not present and deictically inflect their signs in relation to these, gesturers do so in just the same way" (2004, p. 312). Similarly, he argues that there are some equivalents with respect to how speakers perform depictive gestures and the way signers use classifier constructions (see Kendon, 2004, Chap. 15).

In sum, Kendon (2004, 2008, 2018) emphasizes the importance of considering gesture and sign on common ground through historical, functional, and material facets. In contrast to the previous psychological and cognitive accounts, Kendon takes the whole spectrum of gestural forms into account, including signs. Therefore, his proper definition of gesture is not restricted to gesticulation alone and is approached differently in that he adopts the broader label of "utterance visible action"[9] to refer to what is commonly meant by gesture.

As a result, by advocating commonalities and continuities between different gestural types and between gesture and sign, a new conception of language comes to light. To encompass different modalities, spoken and signed, and "flexible interrelations of different semiotic systems" (Kendon, 2014, p. 3), the static view of language must be left behind in favor of a wider approach of our human language ability. To do that, it is critical to start thinking of language as *languaging*, that is, "as something that people engage in, something that they do, and consider how units of language actions or utterances are constructed" (Kendon, 2014, p. 12). In the light of this, it seems that the questions initially formulated as "do signers gesture?" (Emmorey, 1999) or "what insights can gesturing provide for the cognitive and psychological functioning of the human mind?" as inferred from McNeill's, Goldin-Meadow's and Brentari's position, who are only interested in the sole cognitive potential of gesticulation, become obsolete in the quest for understanding how speakers and signers actually make use of language. Thereupon, following Kendon (2008):

> it would be better if we undertook comparative studies of the different ways in which visible bodily action is used in the construction of utterances, whether this is done by those who combine such actions with speech or by those who do not. Such an approach would reveal the diverse ways in which utterance contributing visible bodily actions can be fashioned and the diverse ways in which they can function from a semiotic point of view (p. 358).

By aiming at a comparative semiotic approach, the properties and aspects of gesture as it is used by speakers and by signers can be fully integrated with language theory. In a similar vein, Müller (2018) draws on Kendon's and McNeill's theories to account for the relationship between gesture and sign.

3.1.4 *Dynamic relations emerging within and across languages* (Müller)

Just as Goldin-Meadow and Brentari's (2017) position is informed by McNeill's (1992, 2005) theory, Müller's (2018) argument mainly develops from Kendon's (2004, 2008) observations and his approach to gesture and sign, while at the same time,

[9] See Müller (2018) who argues that the label "visible bodily action", in reality, narrows down the concept of gesture.

acknowledging McNeill's (2005) contributions toward the gesture-sign continua as essential to support her claims.

As Kendon (2008), Müller's position is in favor of highlighting commonalities between gesture and sign, and considering their relations to be dynamic by advocating for a wider conceptualization of what gesture is and does, and by exploring the relation from two points. First, the historical changes of gesture and second, the multimodal comparison within and across two languages, one signed and one spoken language, in contact (e.g., Deutsche Gebärdensprache (DGS) compared to spoken German)

Müller's (2018) arguments are deeply rooted in a broader view of gesture itself along with a take on language that is perceived as fundamentally multimodal in nature (Müller, 2007, 2008), in which composite utterances (Enfield, 2009) represent and act as the perfect instantiations of multimodal language use. Additionally, Müller's (2018) position argues that the multiple dynamic relations between gesture and sign emerge when the analyst considers multimodal language use across different contexts, which includes both, naturalistic and experimental settings. Such an approach, adds Müller (2018), entails "a close semiotic, interactional, and linguistic analysis of all the gestural forms we observe 'in the wild' [...] and the multitude of ways in which they are integrated with speech or sign" (p. 12), therefore, forming composite utterances (Enfield, 2009).

While McNeill (1992, 2005) and Goldin-Meadow and Brentari's (2017) positions rely heavily on singular gestures alone, the work conducted by Kendon (2004) and Müller (2018) includes a wider range of gestural forms and not only considers singular gestures, but also involves recurrent and emblematic gestures, which reveal different levels of conventionalization (for the detailed distinction between singular *vs.* recurrent gestures see Müller et al., 2013). By broadening the scope of gestural phenomena, Müller (2018) argues that a dynamic relation between gesture and sign can arise through two perspectives: (1) historical addressing gesture change over time and (2) comparisons within and across spoken and signed languages in contact. Her view of gesture is grounded in a usage-based, interactional approach to gesture and language. The meanings of gesture for Müller are rooted in "embodied experiences that are dynamic and intersubjective, and not at all like images" (2018, p. 12).

First, in a similar vein to Kendon (2004), Müller (2018) perceives the full range of gestural forms (from spontaneously created gestures to recurrent, and fully conventional ones) on a continuum but not as fixed, separate categories as McNeill (1992) intends it. Instead, by considering the whole spectrum, it becomes clear that these forms can be and are subject to varying degrees of change from gesticulation to sign. Gestural forms may go through processes of conventionalization. In SL research, this successive, historical development has been investigated as lexicalization and grammaticalization processes, in which gesture becomes a source for signed language systems (see Pfau & Steinbach, 2006). Thus, these historical gestural developments, states Müller (2018), are parallel to language change: "Gestural forms may stabilize (through repeated usages) and in some cases, undergo processes of lexicalization and grammaticalization and transform into signs within a signed language" (p. 15).

Secondly, the dynamic relations between gesture and sign emerge properly by building a comparative, semiotic approach to gesture and sign across and within languages in contact. There are two ways, according to Müller (2018), to approach this gesture-sign comparison systematically: either from a gesture perspective (as in exploring the full range of gestural forms in SpL and SL use) or from a SL perspective (as in exploring how classifiers or depictive constructions, for instance, find potential similar instantiations in gesture). As a result, the implications of conducting these kinds of comparisons between both languages are twofold: highlighting (1) "commonalities of gesture and sign resulting from a shared medium of expression (what Kendon refers to as being 'cut from the same cloth')", and (2) "commonalities resulting from language use within and across language communities" (Müller, 2018, p. 15). Thus, these historical and comparative approaches to gesture and sign reveal a dynamic relation between the two that psychological and cognitive approaches fail to unveil.

3.1.5 Concluding on the main approaches to gesture, sign, and language

The ways the gesture-sign relations are apprehended (as divided or on common ground) originate from a problem in the conceptualization of gesture in the researcher's framework. In other words, scholars tend to draw different conclusions because they take different perspectives and pursue distinct research objectives depending on their lines of work, which involve different definitions of what gesture means in the first place. As a result, these different conceptualizations involve looking at different gesture types (singular, recurrent, emblematic) and at different functions (e.g., representational *vs.* pragmatic) in speaking, which, in turn, affect how these scholars address the manifestation of gestural aspects in SL systems.

As witnessed above, exploring the issue of gestural instantiations in language from a cognitive and psycholinguistic perspective (McNeill, 1992, 2005 and Goldin-Meadow & Brentari, 2017) is critically and fundamentally different from exploring the whole spectrum of gestural forms in signing and speaking from a usage-based, dialogic and interactionally-driven perspective (e.g., Kendon, 2008, 2018 and Müller, 2018). The diametric opposition used to describe the link between gesture in both speaking and signing is insufficient to account for the ways in which language users (both hearing and deaf individuals) make use of multiple bodily resources to create composite utterances (Enfield, 2009) in language. Gestures come in different shapes and sizes, and serve a plethora of functions in language. As such, only a more encompassing view of gesture, which is not restricted only to singular gestures that are created on the spot and explored under experimental conditions, can reveal what speakers and signers do in face-to-face contexts (Kendon, 2008; Müller, 2018; Shaw, 2019).

Such a view implies revisiting the conception of language as static in favor of a broader dynamic conception of it as an inherent multimodal phenomenon. If language is considered as fundamentally multimodal (as I argue), then it is by conducting systematic semiotic comparisons between spoken and signed languages, and by considering gesture and sign on common ground, that the embodied, situated discourse strategies that all speakers and signers use to *do* language, can be unveiled. Or, at least, such an approach opens up new paths to start exploring these strategies. To achieve that, "spelling out the concept of gesture" (Müller, 2018, p. 12) is a necessary and mandatory step. It is the main topic of the next section.

3.2 All the way from gesture and language to gesture *in* language use

When researchers highlight discontinuities between gesture and sign, they exclude *a priori* gestural forms from their scope of study, which are, in reality, part of the range of visible bodily actions (Kendon, 2004) that speakers and signers rely on to communicate. This restrictive approach to gesture, and language, prevents from recognizing and exploring the myriad of ways gestures manifest themselves in language, as well as the wide range of functions gestures carry out over the course of a conversation. It is, therefore, essential to go beyond the initial divide by returning to a broader definition of gesture and by revisiting its role in language.

In this line of thought, several scholars have begun to adopt a semiotic take on language, addressing the human language ability as an embodied phenomenon (see Andrén, 2014; Cibulka, 2015; Enfield, 2009; Ferrara & Hodge, 2018; Goodwin, 2007, 2011; Perniss, 2018; Shaw, 2019). The current approach follows this perspective and embraces gesture as a situated phenomenon whose functions and forms are grounded in social interaction.

3.2.1 Gesture vs. non-gesture

When Müller (2018) and Kendon (2008) argue that it is important to consider commonalities between gesture and sign, as well as to apply a broader definition to gesture beyond gesticulation only, they nevertheless advocate for only integrating recurrent and emblematic gestures, that is, kinds of gestures that are officially part of the realm of gesture proper (Kendon, 2004). However, in following Andrén (2010, 2014), the issue is deeper than simply mentioning that a conceptualization problem of gesture results from exclusively relying on the leftmost side of the continuum, viz., gesticulation, and from precluding more conventionalized gestural categories (recurrent gestures and emblems). Another issue that also contributes to favoring a categorical divide originates from what has been argued to count as gesture proper and what has not in the field of gesture studies. The dichotomy does not simply involve differentiating gesture from sign, but it also comes from the solid distinction established between gesture "proper" and other semiotically simpler forms of hand movements (e.g., adaptors). This issue is put forward by Andrén (2010) who claims that "such exaggerations of differences between categories – simple non-gesture versus gesture versus signed language – without a corresponding focus on similarities, has resulted in blind spots in gesture research" (p. 14).

Thus, the gesture-sign divide does not only rest in situating gesture in relation to sign, but also with respect to less complex forms of bodily behaviors considered "non-gesture", which are *de facto* excluded from the gesture definition as potential contributors to the meaning-making process of the utterance. This is where Andrén's (2014) framework comes into play as he has explored this issue in more detail by referring to it as "the upper limit and the lower limit of gesture" (p. 153).

The line between gesture and non-gesture is usually drawn based on the communicative value that a particular movement conveys, a conception echoed by Goldin-Meadow (2003b) who argues that "in order for a manual movement to be considered a gesture, it must be produced with the intent to communicate" (p. 500). Kendon (2004) concurs by claiming that "'gesture' is not used to refer to those visible bodily expressions of thoughts or feelings that are deemed inadvertent or are regarded as something a person cannot 'help'" (p. 8). Thus, the typical definition of gesture, when it is clearly mentioned by the researchers, excludes all other forms of bodily behaviors that lack communicative intentionality including practical actions (e.g., taking notes, handling objects) and auto-centered movements (e.g., self- or object-adaptors; Żywiczyński et al., 2016, 2017). The definitional issue is thus one that involves a binary dichotomy that has prevailed in the field of gesture studies between those gestures that carry communicative intent *vs.* those that lack such explicitness.

Just like the upper limit questioning gesture in relation to sign, it can be asked whether there exists such a binary line between gesture proper and non-gesture or some kind of internal structure that can be analyzed in more fine-grained terms, as Andrén (2014) suggests. One of the reasons for sustaining this binary distinction between gesture *vs.* non-gesture is that the majority of studies in gesture research have tended to focus on exploring gestures which are the products of speakers who sit in chairs and who are recorded as part of experiments to retell narrative episodes as in the famous *Sylvester and Tweety Bird* cartoon. The field of gesture studies suffers from the same bias as the field of SL studies does (Andrén, 2014, p. 156). Only a handful of scholars have addressed the lower limit of gesture as part of their analytical and theoretical framework, therefore, impeding the communicative potential of less complex forms of bodily and instrumental actions from emerging in language use. Yet, as Andrén (2014) pinpoints: "is there really something that necessarily prevents a practical action from being communicative, at the same time?" (p. 158). The answer is no.

For example, in traditional analyses of gestural phenomena in the field of gesture studies, the stroke is usually and almost unequivocally viewed as the gestural phase that bears the meaning-bearing part of the gesture while other phases, such as holds, are not viewed as equally meaningful (some exceptions include Cibulka, 2015, 2016; Groeber & Pochon-Berger, 2014; Oloff, 2013). However, as will be demonstrated in chapter 5, participants do produce manual holds that prompt some kind of reaction from addressees in both the spoken and the signed data. Hence, while holds are not treated as meaning-bearing in usual scientific approaches to gesture, they display here "features of manifest deliberate expressiveness" (Kendon, 2004, p. 15), which, therefore, can be seen as communicative actions. To support this claim, Andrén (2014) goes a step further and provides the following example: a manual hold during the grabbing of an object. A child and his mother are sitting next to each other. The boy keeps pouring himself one glass of milk after another, of which his mother does not seem to approve. Then, the boy reaches for the milk carton and places his right hand on it while looking at his mother and saying: "I pour more?" (p. 168). The child does not release his hand from the carton as he utters those words. Instead, he leaves his hand in exactly the same position beyond his own utterance until his mother has given him the appropriate response to his request. The same dialogical dynamics apply to Andrén's example and those displayed in chapter 5 of this dissertation. Whether the hold takes place during the handling of an object or during a gestural move "proper", the motionless hand serves as "a request for a response" from the addressee (2014, p. 169) in such cases. These instantiations of holds, I argue, should invite scholars to reconsider the communicative value usually described as a defining factor with respect to the status of gesture *vs.* other non-gesture elements.

The same holds true for less complex gestural forms, not considered to be instrumental actions, but belonging to the category of adaptors. Adaptors are usually described as self-touching or object-manipulating behaviors, which have been excluded from gestural typologies for their non-intentional and non-communicative role in language. These forms of discrete manual behaviors have been interpreted in the light of coping with emotional states such as stressful situations (Ekman & Friesen, 1969), and as responding to bodily needs (Żywiczyński et al., 2016, 2017). Yet, research has revealed some of their potential in the management of social interaction. Some studies have shown that adaptors can occasionally change the participant's behavior, as is the case for instance when participants subconsciously imitate their conversational partner's self-touching behaviors (e.g., face-rubbing or foot-shaking), referred to as *mimicry* (Kimbara, 2006, 2008). Żywiczyński and colleagues (2017) argue that this kind of social conduct, "increases the smoothness of interaction and sense of affiliation between participants [...] and plays an unintentionally informative role, e.g., by providing information about increased prosocial orientation" (p. 5). In a similar view, Tellier (2009) has also pointed out that these types of moves can affect the interaction if, for instance, "one nervously […] taps on the table with their fingers, their addressee might end the conversation earlier than planned" (p. 2). Finally, Maricchiolo et al. (2005) found a significant association between adaptors and markers of interaction management (such as turn-taking, interruptions, backchannelling) as well as social cohesion markers and pauses (in the absence of speech).

Żywiczyński et al.'s (2017) study demonstrates that adaptors are actually involved in the coordination of the turn-taking system. They found that participants in dyadic interactions produced significantly more self-adaptors close to turn borders. Their finding still supports the view that adaptors are self-oriented types of behavior but their results reveal their important role in language use and suggest they can be considered "communicatively relevant actions of interpersonal dialog" (Żywiczyński et al., 2017, p. 19). Cibulka (2015) also refers to the interactional potential of adaptors. He argues that, although they have been prescribed meaning and seem random, they are still recognizable and available resources for the addressee to interpret the primary speaker/signer's actions. For instance, he states that "self-touching is mobilized as part of a practice in order to display disengagement from the interaction and to repel gaze, which, in turn, paves the way for [the speaker] to complete her contribution" (p. 17).

Thus, by moving away from a binary dichotomy and approaching gesture in terms of an upper and lower limit, which are viewed as dynamic dimensions rather than fixed categories on a set of continua, it is possible to encompass and discover various gestural forms along with gestural phases other than the stroke that show potential to be meaningful *in* language.

3.2.2 Clarifying the conceptualization of gesture

The point of departure to define gesture here follows the conception that emphasizing the differences between absolute categories of non-gesture *vs.* gesture *vs.* sign has precluded various gestural forms from emerging and becoming noticeable in language as used by speaking and signing communities. However, independently of "communicative intent and regardless of whether a given segment of behavior is recognizably produced in order to be noticed or not, at any time the body constitutes a locus of meaning as it provides others with resources for interpretation" (Cibulka, 2015, p.4). Therefore, following Andrén's (2010, 2014) conception of the lower (and the upper) limit of gesture, and Bolly and Boutet's (2018) position, the bodily behaviors counting as part of *gesture*, even if they are not "necessarily intentional" (Bolly & Boutet, 2018, p. 2), show the potential to be meaningful in the context of their production (Kendon, 2004) and remain a visibly recognizable resource available at all times for interpretation. By expanding the scope of previous gesture characterizations, this definition allows for an integration of a wider range of bodily movements, including less conventionalized forms. These take into account manual and body gestures as well as facial displays and gaze, which contribute to the meaning-making construction of utterances in interaction, and reposes the question as to what it means for spoken and signed languages to be *gestural* languages (Shaw, 2019).

3.2.3 Language and gesture in interaction

By broadening the definition of gesture as it deploys in contexts of social interaction, described as the "home habitat" (Schegloff, 1996) and the "ecological niche" of language use (Perniss, 2018), it is possible to unveil aspects of language in its spoken and signed forms that would otherwise not be considered. Therefore, social interaction appears as "the fundamental site for observing how language […] works […], for describing how social relations […] develop […] and for studying the resources on which participants rely in order to communicate" (Mondada, 2013, p. 578).

While McNeill's (1992) typology remains a strong influence on the examination of gesture in SpLs and SLs, other scholars, who approach language as inherently multimodal (e.g., Andrén, 2014; Enfield, 2009; Goodwin, 2007, 2011; Kendon, 2004; Müller, 2008; Streeck, 2009), have begun to highlight the discrepancies of treating gesture as divided into separate categories. Rather, they have started to pay attention to gesture as part of multimodal composite utterances, and the functions of these within social interaction. Following these researchers, I am interested in uncovering the ways interactive gestures participate in the process of meaning construction as part of multimodal composite utterances (Enfield, 2009) that speakers and signers create in situated face-to-face language use. Enfield (2009) defines the composite utterance as "a complete unit of social action which always has multiple components, which is always embedded in a sequential context (simultaneously an effect of something prior and a cause of something next)" (p. 223)

How participants construct meaning as part of their utterances in face-to-face conversation does not exclusively rely on speech or the knowledge of the grammatical rules of a language. It also involves the body, including, hands, eye gaze, facial expressions, head, shoulders, and torso moves, along with interactive footing (see Goodwin, 2006) unfolding in the situated context of production, as "environmentally coupled gestures" (Goodwin, 2007). In face-to-face encounters, linguistic constructions and multimodal resources (Mondada, 2013) mutually elaborate upon one another to create meaning. The interrelations of linguistic and body resources have been the object of several studies (e.g., Goodwin, 2007, 2011; Streeck, 2009).

Not all manual gestures are related to the topic of discussion. Some gestures in fact play a role at the level of conversational management, and attend to the smooth unfolding of the co-participants' conversational exchange. The next section reviews a number of studies that have examined this role of gesture in spoken languages.

3.3 The interactive nature of gesture

3.3.1 Terminological clarifications

Partly due to the deeply-rooted psychological and psycholinguistic traditions (McNeill, 1992, 2005), most research in the field of gesture studies has long been focusing on those gestures related to utterance content (e.g., iconic and metaphoric gestures). Apart from a few exceptions, the interactive nature of gestures has been *terra incognita* to many (Bavelas et al., 1992, 1995; Holler, 2010; Payrató & Teßendorf, 2014). Nevertheless, there is now a growing body of research that has started to recognize that gestures are not only concerned with the propositional content of utterances (viz., the topic of conversation) but rather, that they also play a role in the management of the social context in which they take place (Bavelas et al., 1992, 1995).

When in co-presence, that is, when participants are "in the same physical environment" (Gerwing & Bavelas, 2013, p. 822), individuals produce gestures that serve interactive purposes in conversational exchanges. This kind of gesture has received many labels in the scientific literature such as "performative and recurrent gestures" (Ladewig, 2014), "speech handling gestures" (Streeck, 2005), "pragmatic gestures" (Kendon, 2004) or "interactive gestures" (Bavelas et al., 1992, 1995). The present work draws on the latter as it was coined by Bavelas and colleagues (1992, 1995), and the functional typology used in the current framework relies in part on their typology developed for interactive gestures (see Chap. 2).

Lastly, drawing on Bavelas and Gerwing's (2011) work, the person the speaker is directly addressing in a face-to-face encounter is more than a simple listener or what they call "an overhearer" (p. 180). The term "addressee" has been selected to refer to that person (speaker or signer) who can interact and respond in the social exchange as opposed to listeners who are found in strict settings such as television, radio, and parliaments and who cannot interact with the primary speaker or signer. Because interactive gestures directly involve the person the speaker/signer is addressing in the interaction, the term "addressee" is used.

3.3.2 Functions of interactive gestures

Interactive gestures are defined as those movements that help "maintain the conversation as a social system and make reference to the interlocutor" (Payrató & Teßendorf, 2014, p. 1532). Additionally, Streeck (2005) has highlighted that interactive gestures underline "aspects of the communicative interaction itself" (p. 73) as in, for instance, referring to the addressee's previous utterance. In line with Streeck's statement, the interactive and social designs of these gestures are particularly important to describe, as they do not refer to the topics of talk but point to the other conversational partner instead, involving him/her in the social interaction. Now, the ways those gestures involve the addressee in the interaction are multifaceted. Bavelas and colleagues (1995) have highlighted four major functions, namely, delivery, citing, seeking, and regulating, with twelve specialized sub-functions (p. 337):

- ❖ **Delivery gestures** mark the content of the information as new *vs.* shared;
- ❖ **Citing gestures** refer to the addressee's previous contribution (acknowledgement);

- ❖ **Seeking gestures** aim to elicit a response from the addressee (seeking agreement, understanding, or help during word search activities);
- ❖ **Regulating gestures** maintain the flow of conversation with respect to turn-at-talk (e.g., taking or forestalling the turn) (Bavelas et al., 1992, p. 473)

In turn, the addressee becomes active in the interaction as well by providing "backchannels, responses, and interactive facial displays" (Payrató & Teßendorf, 2014, p. 1532). All of this underlines the bilateral, collaborative and social process of interactive gestures in dyadic encounters, and highlights the importance and relevance of examining gesture "multi-modally, socially, and in detail" (Holler & Bavelas, 2017, p. 233).

An illustration of a typical interactive gesture involves the gesturer's hand flicking toward the addressee in the form of an open palm or pointing fingers referring directly to the addressee, both of which can be paraphrased with the sentence "as you know". A gesture performed in this way refers to "something that the participants ha[ve] discussed earlier" and "[i]s now marked as common ground" (Gerwing & Bavelas, 2013, p. 828).

3.3.3 Some investigations of interactive gestures

As a means to illustrate the previous claims, several studies are reviewed below that provide compelling evidence regarding gestures' role in managing the interactive and interpersonal aspects of face-to-face conversations, which do not exclusively refer to the referential semantic content of the information transmitted. In addition, the following studies also shed light on how social interaction and its variables shape gesture usage among participants.

3.3.3.1 Visibility and dialogue as independent influences on gesture

Early studies (Bavelas et al., 1992) usually concluded that participants produced more gestures when they could see their addressee than when they could not. Bavelas and colleagues (1992) carried out a study in which participants were recorded under two conditions: the speaker was interacting either with a visible addressee *vs.* alone and addressing a camera. The results were interpreted to conclude that individuals gestured at a higher rate in the situation where the speaker could see the addressee *vs.* seldom when alone. However, other analyses have suggested that people keep producing gestures although their addressee is out of sight, such as when they are on the telephone (Bavelas et al., 2008). Thus, why do participants keep gesturing on the phone even though there is no visible addressee? The reason, pointed out by Bavelas et al. (2008), is due to being in a dialogue situation, that is, a situation where both parties are able to express themselves spontaneously, "be self-determined, and act as themselves" (Gerwing & Bavelas, 2013, p. 822). In this type of work, the manipulated variable was visibility, whether speakers could see their addressee, and not whether participants could engage freely in a dialogue.

Bavelas et al. (1995) first elaborated this claim in a study where participants were recorded under two conditions in order to test whether there would be a difference if the visible addressee could not take part in the conversation with the speaker. There was one condition in which participants could interact freely and another one in which participants would tell each other half of the cartoon but were not allowed to help each other. The results revealed that "even though there was a visible addressee in both conditions, the dyads in the full dialogue condition made interactive gestures at a significantly higher rate than those in the sequential monologue" (Gerwing & Bavelas, 2013, p. 829).

Later on, Bavelas and colleagues (2008) explicitly tested this claim in an experiment that differentiated visibility from dialogue, and under three conditions: (1) visibility plus dialogue condition (talking to an addressee face-to-face), (2) dialogue only condition (on the telephone), and (3) neither visibility nor dialogue condition (monologue to a tape recorder). The participants had to describe an 18th century dress in one of the three conditions. The results indicated that dialogue constituted in itself an independent variable that had an independent effect on the rate of gestures, regardless of and "in addition to the visibility effect" (Bavelas et al., 2008, p. 515). Thus, people keep producing gesture even when their addressee is out of sight because they are in a dialogue situation. While dialogue affects gesture's rate independently, visibility has an effect not only on how much people gesture but also on *how* they gesture. The researchers found that speakers in face-to-face condition produced larger and bigger gestures (life-size gestures), they gave information through their gesture that was not in their speech, they referred to their gestures verbally with deictic expressions when they knew their gestures were visible, and they performed gestures supporting the interaction itself as well. Both conditions, visibility and dialogue, affected the category of interactive gestures.

These findings with respect to interactive gestures concur with previous ones. Not only do interactive gestures display a higher gesturing rate in face-to-face dialogue than when the speaker is alone (see Bavelas et al., 1992, Exp. 1), their rate also depends on whether interactants are placed in face-to-face dialogues *vs.* sequential monologues with face-to-face exchanges (Bavelas et al., 1995, Exp.1). However, interactive gestures are also highly sensitive to visible addressees. As demonstrated in Bavelas et al. (1992, Exp. 2), the number of interactive gestures produced in dialogic situations where speakers could not see their addressee decreased significantly, "presumably because they would not be useful to the addressee" (p. 517). Thus, interactive gestures are tightly linked to the social context in which they occur where dialogue and visibility play a crucial role in their emergence.

Alternatively, Kimbara (2006, 2008, 2014) also showed how visibility affects gesture but in another regard: she was interested in examining whether participants who saw each other tended to produce similar gestures to describe a similar event in face-to-face conversations. She labeled this kind of gestural repetition, "gestural mimicry", which she defined as "a recurrence of the same or similar gesture between speakers through monitoring and not by a mere coincidence" (Kimbara, 2014, p. 1371), used to establish affiliation or cooperation (e.g., during a word search) among participants in the course of an interaction. In her 2008 study, Kimbara compared two groups of participants involved in a joint-description task: those who could see each other *vs.* those who could not (but could hear each other). She found that the handshapes of the gestures produced by both members of the dyad in the visibility condition were more alike than the ones in the non-visibility condition. Her findings revealed how one speaker's production of gesture influenced the other person's gesturing, underlining the collaborative processes of conversation through gesturing. A very interesting note regarding Kimbara's (2008) approach is that she resorted to using ASL handshape descriptions to code the speakers' handshapes in the study: "ASL handshapes provided useful coding labels to broadly categorize the handshapes of speech accompanying gestures based on their similarity in form" (p. 129).

Whereas the above-mentioned studies illustrate the extent to which visibility affects gesture production, especially for interactive gestures that tend to decrease if the visibility condition is not met, others have shown how speakers produce gesture in reference to and in accordance with the addressee's spatial location, and more precisely, with respect to body orientation. Özyürek (2002) and Furuyama (2000) are two relevant illustrations of this.

3.3.3.2 Addressee location and orientation

Özyürek (2002) conducted a study in which she experimentally evaluated the way speakers produce gestures based on the spatial location of their addressee. The author's hypothesis was that if gestures were made for addressees for communicative purposes, then the formal design of gesture should change when those addressees were placed in different locations. Participants had to retell sequences of a cartoon to an addressee who had never seen it and who was placed at different locations to the speaker (e.g., across from or right next to the speaker). The results suggested that participants modified "the orientation of their gestures depending on the location of the shared space, that is, the intersection of the individual gesture spaces of the speakers and addressees in the communication" (2002, p. 690). This study reveals the interactive nature of gestures in space as it displays how speakers in dialogue modify the orientation and directionality of their hand gestures depending on the addressee's location, so that gestures are made visible and their meanings clearer.

Another example is Furuyama (2000) who also focuses on the interpersonal aspect of gesture in dialogue by trying to provide an answer to the following question: "Do people gesturally interact with each other?" (p. 99). More specifically, he looked at how the gestures of one speaker (an instructor) affect someone else's gestures (a learner). In an origami instruction setting, involving dyads of an instructor teaching learners how to make a complex origami figure with no paper or utensils, the experiment revealed how the instructors regularly oriented their gestures and bodies to their addressees (viz., the learners) so that the information transmitted could be easily interpreted. In turn, the learners frequently built on their teacher's gestures, sometimes invading personal space and even at some point touching the instructor's gesture, to carry out the task with success. Furuyama called these "collaborative gestures", that "interact with the gestures of the communicative partner [...]", and whose meaning "depends on the interlocutor's gesture, since the interlocutor's gesture is part of the collaborative gesture as a whole" (p. 105). Although this kind of gesture analysis underlines the potential of gestures as collaborative acts, it also clearly displays some of the interactive characteristics of what are labeled "interactive gestures" in this dissertation.

3.3.3.3 Monitoring understanding and attention

Drawing on the previous studies, Clark and Krych (2004) analyzed dyads (instructors-builders) in which one individual (the instructor) was teaching another (the builder) how to build a Lego structure. The builders could not see the instructor's models of the Lego block and had to follow the instructor's guidelines to build it. Additionally, Clark and Krych manipulated the visibility and dialogue variables in that they tested the participants in different conditions: whether they could see each other (or not) and whether they could engage in dialogue (or not). This manipulation of these two variables is similar to what Bavelas and colleagues went on to do in their 2008 study.

Thus, in one group of Clark and Krych's (2004) study, the instructors could see the builders' workspace, in another they could not, and in a third group, the instructors provided the explanations to the builders via an audio recording. Their findings indicated that the pairs of participants who completed the Lego constructions significantly more quickly were those who could see the workspace and who could engage freely in dialogue. Moreover, when participants could see the workspace, "builders communicated with directors by exhibiting, poising, pointing at, placing, and orienting blocks, and by eye gaze, head nods, and head shakes, all timed with precision" (Clark & Krych, 2004, p. 62). All of these manual and non-manual gestures were considered communicative instantiations of the builder's current understanding of the instructions, and consequently had an effect on the director, who adjusted his own utterance accordingly. Indeed, the instructors would stop providing further instructions if steps were correctly understood by the builders or in the case of incorrect reproductions, the instructor would correct the builder's actions to redirect them.

Their results revealed that when people are engaged in a joint task, they collaborate through gestures to provide each other with feedback about their ongoing mutual understanding regarding the task in question. As such, speakers monitor their addressee to check for their understanding, and, if necessary, modify their own utterances; and, in turn, addressees provide speakers with gestural cues as a means to signal their state of understanding and following on a moment-by-moment basis.

3.3.3.4 Shared knowledge

Individuals do not simply coordinate their mental states and behaviors through speech alone, but gesture also plays a part in this coordination. It has been shown that speakers adapt their utterances depending on whether they and their addressees share some common ground or not. Common ground, defined as "the knowledge, beliefs, and assumptions that interlocutors share" (Holler & Bavelas, 2017, p. 218), represents another social variable that affects the rate and the shape of gesture.

Research has revealed that speakers tend to express themselves with fewer words and to include less semantically relevant information in their utterances (Holler & Wilkin, 2009) when more common ground is present between interactants. However, multimodal investigations involving gestures have highlighted how participants also rely on previous personal common ground and constantly update the status of their knowledge with their addressee even over the course of face-to-face conversations, and how, in turn, mutually shared knowledge affects participants' gesturing rates and forms. Yet, these various studies have reached different conclusions and reported mixed results.

For instance, Gerwing and Bavelas (2004) induced common ground in an experiment where participants were placed in different conditions (common ground *vs.* no common ground) manipulating a set of toys. They found that the participants' gestures in the common ground situation became "sloppier", they were less precise, conveyed less information, and were performed at a lower rate in contrast with the participants' gesturing in the no common ground condition, "presumably because they were all that this addressee needed" (Gerwing & Bavelas., 2013, p. 833). Alternatively, a further look at the results on the participants' gesturing in the initial no common ground condition revealed that, with the common ground increasing over the course of the exchange, speakers performed more precise gestures to refer to new objects, they were sharper, larger, and clearer (Gerwing & Bavelas, 2004, p. 157) while gestures articulated later to refer back to these objects were smaller or less precise. Holler and Stevens (2007) built on those findings and established that the number of gestures as well as the size and precision of those gestures decreased in a situation where participants knew that their addressee had already seen the scene. However, others have reached different conclusions (e.g., Holler & Wilkin, 2009; Holler & Bavelas, 2017). Holler and Wilkin's (2009) results demonstrated that the number of gestures increases and gestures do remain informative.

Drawing on Bavelas et al.'s (1995) typology of "shared information gestures", Holler (2010) investigated the use of specific interactive gestures and their relation to the existence of common ground (or not). Based on video-recordings of narratives as stimuli, participants interacted under different conditions: either the content of the scenes was known to both conversational partners (common ground situation) or only the speaker (not the addressee) knew the scene (no common ground situation). Holler decided to investigate two forms of interactive gestures specifically, namely, the palm-up open hand gesture and the deictic pointing gesture aimed directly at the addressee, as potential common ground gestural markers, and to compare "the frequency with which they elicit addressee responses, and how prompt these responses are" (p. 17). Her results indicated that the two specific interactive gestures investigated were used as markers of common ground, which were more frequent when previous knowledge was shared among speakers and addressees than when it was not. Moreover, the results revealed that the speaker's use of index pointing gestures elicited more feedback responses from the addressee than the palm-up open hand gesture investigated. Holler suggested that this was because index pointing gestures could be viewed as the more "imperative form of common ground related interactive gestures" (p. 20), prompting a more urgent request for the addressees' response.

3.3.3.5 Turn-taking patterns

The interactive functions of gesture not only manage the social dynamics of the speaker-addressee relationship over the course of an interaction, but they also concern "all the features of conversation management (such as turn taking and synchronization" (Maricchiolo et al., 2014, p. 1467). Pre-dating this claim, Bavelas and colleagues (1992, 1995), in their classification of interactive gestures, had already integrated these two kinds of social regulating functions, categorizing some of the interactive gestures as turn-management devices (e.g., to take, maintain, or yield the floor). The organization of turns-at-talk and the ways participants coordinate their actions within this hierarchical system of conversational activities has largely been investigated as a multimodal phenomenon (Mondada, 2007). Participants deploy a series of bodily features such as gaze, facial expressions, head nods and tilts, hand gestures, body orientation, and the like, that participate in the management of turn-taking (Maricchiolo et al., 2014).

Several researchers (e.g., Bohle, 2014; Goodwin, 2000, 2007; Mondada, 2007, 2013; Streeck & Hartge, 1992; Streeck, 2009, 2011) have investigated the roles of interactive gestures in the set-up and management of turns showing that they "are interactively designed by the participants moment-by-moment in an interactive way" through gesture (Mondada, 2013, p. 580). This type of approach is applied in Goodwin (2000) who analyzed the roles of eye gaze and body shifts in the turn-taking management of two kinds of situated interactions: "young girls playing hopscotch and archaeologists classifying color" (p. 1489) to demonstrate the embodied nature of human interaction.

With respect to the role of hand gestures in the regulation of turn-taking, work has been conducted showing that manual gestures can be used by speakers for signaling turn ending, yielding the floor, or as cues for the speaker to keep the floor (Bavelas et al., 1992; Bohle, 2014; Müller, 2004; Mondada, 2007; Streeck & Hartge, 1992; Taboada, 2006). Some investigations of gesture in turn-taking have shown how it can be used by one of the participants to request the turn in alternating speakership among participants (Bohle, 2014), and to predict turn completion (Mondada, 2007). In an analysis of dyadic conversations, Bohle (2014) examines how speakers make use of gestures for speakership change (e.g., for smooth turn transitions between participants) and turn-competitive entries. Bohle (2014) claims that if current speakers are interrupted, they "may continue, recycle, or hold a gesture just begun in order to maintain speaking rights without actually speaking and holding meaning aspects of the interrupted turn visibly relevant" (p. 1364). This kind of phenomenon has been attested in chapter 5 on the study of holds. Streeck (2009) has also shown how holds can be performed during moments within a turn when the speaker solicits the addressee's response. While Mondada (2007) investigates such turn-regulating functions for index pointing gestures (referred to as IFE-G in the present dissertation, see Chap. 4), Streeck highlights the particular role of open-handed gestures (referred to as PU in the present dissertation, see Chap. 3) in the "tasks of turn-taking and speaker change" (p. 187). These two gestural forms seem to be actively engaged in regulating turn-at-talk, in addition to managing common ground between participants (Holler, 2010). These roles assigned to index pointing and palm open-handed gestures by these researchers will be kept in mind when analyzing the broader range of their interactive functions in chapters 3 and 4, respectively.

3.3.4 Intermediary summary

Taken together, the above-mentioned studies pinpoint crucial implications for the integration of gesture *in* language. The scholars interested in and exploring the interpersonal and interactive dimensions of gesture reinforce the claim made by Kendon (2008) and Müller (2018) that it is high time to go beyond the inner, cognitively driven models of gesture to include a more socially regulated conception of it. Gesture is not exclusively an *intra*-personal phenomenon revealing the imagistic side of language (as advocated by McNeill, 1992, 2005, and Goldin-Meadow and Brentari, 2017), but it is also highly *inter*-personal, assisting the dialogic process of interaction by regulating the dynamics of the speaker-addressee relationship and managing aspects of interaction itself, e.g., turn-at-talk. Thus, gesture does have a role to play at the level of language in social interaction, and these studies make the case for such a perspective.

The human body, through gesture and other bodily conducts such as eye gaze, body shifts, and other non-manual expressions, is capable of revealing aspects of language other than those linked to the propositional content of utterances to create meaning. Beyond its referential-propositional functions, gesture shapes and is shaped by dynamic interactional processes of the ongoing social interaction. How interaction shapes people's gestures in form and in meaning depends on a series of different factors. The gestures, serving a variety of interactive and collaborative functions, are sensitive to visible availability and dialogue (face-to-face *vs.* telephone *vs.* audiotape), the level of shared knowledge (common ground contexts), attention and understanding of addressees (monitoring and collaborative situations), the spatial orientation of the conversational partner, as well as the hierarchical structure of conversations involved in the turn-taking system.

Hence, each individual when entering a conversation has different dispositions and expectations, and several social factors impose a certain number of constraints on gesture use. These studies highlight the importance and relevance of addressing the social, interactive nature of gesture in SpL conversations. However, signers of SLs also have to collaborate, regulate the interpersonal aspects of their ongoing conversations, and monitor *in situ* the understanding and following of their addressees, in addition to paying attention to turn-taking regulations in order to ensure a smooth flow of communication. In other words, signers "must too have competence in the rules of interaction in their specific speech communities" (Mesch, 2016, p. 22).

3.4 Signed interaction

Since Stokoe's (1960) groundbreaking work on the linguistic infrastructure of ASL, the majority of studies in SL linguistics have largely focused on the grammatical and lexical descriptions of signs as argued by Cibulka (2015, 2016). By contrast, comparatively little work has been conducted thus far on the pragmatic and interactional mechanisms of discourse, particularly with respect to naturally occurring face-to-face conversations between signers (however, there are some exceptions, de Vos et al., 2015; Manrique, 2016; McIlvenny, 1995; Shaw, 2019). As raised by Baker and van den Bogaerde (2012), some "aspects have not been studied at all and thus the data we can report are limited. It will be a challenge of the next decade to broaden our knowledge in this area" (p. 490).

Some scholars have paid, albeit limited, attention to various dimensions of discourse analysis, including sociolinguistic, pragmatic, and interactional aspects of SLs, looking at how language is used when deaf individuals interact. Different studies have examined strategies that establish coherence and cohesion in discourse (e.g., Leeson & Saeed, 2012), the use of discourse markers (e.g., Engberg-Pedersen, 2002; Gabarró-López, 2017, 2020; Hoza, 2011; McKee & Wallingford, 2011; Roy, 1989) as well as mechanisms to "involve addressees more intently in what is being uttered (rhythm, rhyme and repetition)" (Metzger & Bahan, 2001, p. 125).

Pragmatic investigations of SL discourse have been carried out, for instance, on Grice's (1975) "Co-operative Principle" (see Baker & van den Bogaerde, 2008, for examples in NGT and Johnson, 1994, for examples in ASL), Searle's (1969) "Speech Act Theory", and the role of politeness in indirect and direct discourse (Celo, 1996; Roush, 1999). Campbell (2001) is one of the few scholars who have applied Searle's Speech Act Theory to a sign language, ASL. She compared direct speech acts in English and ASL. The art of making indirect requests in a SL has also been studied, for example in NGT (Nonhebel, 2002).

Perhaps, the area of signed discourse that has received most attention from scholars is related to the turn-taking system. How signers organize their talk to take, maintain, or yield the turn, how conversational repair (e.g., self-initiated repair, other-initiated repair, and so on) is undertaken, and how overlap in signing occurs in signed talk are three areas in conversation analysis that have attracted the most research. One of the earliest and rather detailed descriptions of how signers regulate their interaction and organize their conduct for turn taking in a SL is found in Baker (1977). On the basis of video-recorded conversations between two pairs of signers in ASL in a semi-directed environment, her findings report various turn-regulating strategies that signers deploy to initiate, maintain, and yield their turn, namely, *initiation, continuation,* and *shift regulators* (Baker's terminology, 1977).

One way for signers to take the floor is by ensuring the visual attention of their addressee. As Baker (1977) notes for ASL, signers can initiate a turn by raising their hands from rest position, displaying a first index finger, for instance, showing the signer's willingness to start signing. Thus, to obtain their addressee's visual attention and take the floor, signers can use an index point, touch the addressee, or produce an *attention-getting device* where a hand is waved in front of the addressee (Baker, 1977, p. 218). In her analysis, Baker attaches an important function to the establishment of mutual eye gaze between interactants claiming that the "speaker cannot initiate a turn until the desired addressee looks at the potential speaker" (p. 221). However, previous mutual eye gaze is not necessarily mandatory to initiate a turn (Coates & Sutton-Spence, 2001), and "incipient signers regularly launch a turn even without previously established mutual gaze and without explicit attention-getting devices" (Girard-Groeber, 2015, p. 4). Signals deployed to keep the floor include gaze aversion from addressees, increase of sign speed, and freezing of the last sign (viz., post-stroke holds). Lastly, what Baker calls "shift regulators" correspond to a series of strategies used by the current or next signer to show that there is a change in speakership. Shift regulators for the current signer primarily include a gaze addressed at the incipient signer, along with a decrease in the signing speed and a return to rest position. Alternatively, the next signer signals to the primary signer his willingness to take over by an increasing number of PALM-UPs, head nods, or gazing away from the primary signing stream (Baker, 1977; McIlvenny, 1995; McCleary & Leite, 2013). All in all, Baker's study is enlightening, especially with respect to the early nature of her research of signed talk, and her interests in both the signer's and the addressee's roles in conversation.

Other researchers have also examined and found additional characteristics belonging to the organization of turn taking in different SLs. For instance, Dively (1998) analyzed repair sequences in ASL conversation and Manrique (2011, 2016) conducted analyses on repair strategies in Argentine Sign Language (LSA). Others investigated the management of turn transitions as well as overlap in signing, their timing and their resolution (e.g., in British Sign Language (BSL); Coates & Sutton-Spence, 2001; NGT, de Vos et al., 2015; Swiss-German Sign Language (DSGS), Groeber & Pochon-Berger, 2014; Brazilian SL (LIBRAS); McCleary & Leite, 2013). For instance, analyzing informal BSL conversations, Coates and Sutton-Spence (2001) found that one of the functions of overlapping talk in signing served to establish collaborative grounds in the discourse of deaf women. As Baker and van den Bogaerde (2012) highlight, this kind of overlap does not create conversational trouble but rather it shows "stretches of discourse where utterances of multiple participants overlap but jointly contribute to the same topic and complement each other [...] such overlaps have been argued to have their base in the establishment of solidarity and connection" (p. 497). Coates and Sutton-Spence's (2001) results for the collaborative elaboration of turn-taking patterns, however, differ from other studies' findings that have revealed that signers engage in the one-at-a-time principle when taking turns (Groeber & Pochon-Berger, 2014; McCleary & Leite, 2013; Mesch, 2001). Even studies on tactile

SLs have described the functioning of turn-taking patterns, such as conversational repair practices and backchannel responses (e.g., Swedish Sign Language (STS); Mesch, 2001; Auslan; Willoughby et al., 2014).

Another key component of the turn-taking system in language, which has received attention in SL analysis is the role of backchannel responses performed by the addressee during the primary signer's turn. This kind of study is found in Mesch (2016) in STS dyadic conversations. Her findings underline the importance of the roles of non-manual cues in providing backchannel responses as opposed to manual ones (80% *vs*. 20%, respectively), as well as differences in backchannelling between older *vs*. younger STS signers. She describes how a younger signer tends to produce "weak manual activity in lap [...] lifts the finger, or the hand, very slightly" (p. 32) more often than older signers for backchannelling purposes. Alternatively, older signers tend to repeat their interlocutor's signs more often.

Despite the overall tendency for a lack of work devoted to the study of conversational discourse and its related aspects in signed talk, there has been an increasing enthusiasm for conducting research on this side of linguistic scrutiny for the last decade. The SL studies reviewed above embody, to some extent, this impetus. Additional characteristics of signed discourse and signed talk involving the interactive uses of PUs, IFE-Gs and holds in different SLs are further discussed in their respective chapters of this dissertation (see Chap. 3, 4, and 5, respectively).

3.5 Toward a unified theory of gesture in language

Contemporary research has begun to argue and present new evidence for a paradigm shift regarding the current theories of language (see Ferrara & Hodge, 2018; Perniss, 2018; Puupponen, 2019). However, none of the above-mentioned SL studies in section 3.4 have looked at the bigger picture. The other bodily conducts involved in managing the signer-addressee relationship and their interactional implications in language use often fail to be compared to spoken counterparts, or taken into consideration in theories of language (e.g., gestural holds or adaptors). To my knowledge, there is only one study (Shaw, 2013) that has drawn on Peircean semiotics (Peirce, 1955) in a tradition of interactional sociolinguistics to analyze aspects of signed talk, and compare such aspects to those employed by speakers in spoken interaction, therefore, presenting a more comprehensive case for a unified theory of gesture *in* language.

Shaw's (2013) dissertation was devoted to the study of gestural phenomena adopting Enfield's (2009) multimodal composite utterance as an object of analysis in both spoken (American English) and signed (ASL) discourses. Her research examines the use of gesture in multi-party interactions of friends during two game nights in their home (naturally occurring spontaneous data): one in spoken American English including four hearing speakers and one in ASL including four deaf friends. Shaw collected the data by gathering participants from each group (ASL and American English) to play the game *Guesstures*, in one of the player's homes. *Guesstures* is a game of acting and guessing, where players attempt to help the other participants guess words using only their body to communicate, like *Charades*. Shaw's goal is perfectly stated in the following quote:

> I compare these two groups as a means of addressing the theoretical divide that is becoming more entrenched as sign researchers begin to reintegrate previously controversial claims of gesture's relationship to language. I also use the comparison as a means of illuminating similarities across groups and the benefit of applying close analyses of behaviors of the body to spoken discourse data (p. 67).

During her annotating process, Shaw (2013) identified a number of embodied conducts that emerged during the game nights in both groups. The first forms are what she calls the KEEP GOING and C'MON gestures. The former displays the open hands or index fingers which rotate clockwise over each other several times and are directed toward the guessing participant, while the latter "consists of one or both bent flat handshape(s) oriented palm up with the fingers bending toward the gesturer multiple times" (Shaw, 2013, p. 79). These two forms are used in a similar fashion by speakers and signers to provide encouraging signals to the guessing addressee to continue along a certain line of guessing (Shaw, 2013, p. 101). Secondly, Shaw analyzes the use of pointing at a guessing player with an index when s/he had correctly guessed the right word, which she found was much more frequent in the hearing group than among the deaf participants, and functioned akin to Bavelas and colleagues' (1992, 1995) interactive citing function. Lastly, she explored the use of gaze, which acted as a turn-yielding device. These findings highlight the similarities in the interactive practices deployed by both groups in their use of gestures to respond to guesses, both correct and incorrect ones.

In addition to these gestural forms, Shaw (2013) paid attention to two other forms that emerged "outside the turn-at-play" (p. 80): what she refers to as the "Open Hand Palm Up gesture" and the "Gun Handshape Palm Up", in which the thumb and the index finger are extended and the palm faces upward. These two forms correspond to the PU and the IFE-G investigated in the present research (except that for the IFE-G, all hand orientations were taken into account, not just the palm-supinated forms).

Interestingly, Shaw (2013) applies Bavelas et al.'s (1995) typology to analyze the Open Hand Palm Up when used as an interactive gesture for delivering, citing, seeking, and turn-regulating purposes, and shows it can serve these functions in both groups. The palm supinated base form of the PU sheds light on another variant, which Shaw calls the "Gun Handshape Palm Up". It serves a slightly different, but complementary, function to PU in discourse. Shaw found that new topics in discourse were introduced using the PU gesture whereas the Gun Handshape Palm Up was used to indicate salient information, which had already been given. These two forms seem to appear at different times and for slightly different communicative purposes during the participants' interactions. This distinction had already been established in previous studies (e.g., Holler, 2010; Jokinen, 2010). It would, therefore, be enlightening to compare these two forms as regards the expression of common ground in future studies.

In sum, Shaw's (2013) study is enlightening in many respects. First, her unit of analysis taking Enfield's (2009) composite utterance as a point of departure to examine signed and spoken discourses as well as her theoretical framework situated at the discourse level of language in interaction, and the contrastive perspective analyzing comparable phenomena in a signed *vs.* spoken language, taken together show the path for further work. Secondly, her methodological approach is unprecedented in SL studies by gathering and comparing naturally occurring conversations between hearing *vs.* deaf friends in their homes. Lastly, her findings support the shift advocated for not only viewing gesture as a separate and isolated category on a continuum (Kendon, 2008; Müller, 2018) but also for seeing it as inherently and fundamentally dynamic, providing supporting evidence for a unified integration of gesture *in* language, as much a part of the hearing linguistic code as that of deaf individuals.

4 The Current Approach

This chapter has taken a step back to review the intertwined histories of sign languages and gesture, and their relationship to language. For a long time, gesture and sign have both been viewed as the black sheep of linguistics, due to structuralist and formalist models of language in vogue in the twentieth century, placing investigations of spoken language phenomena as paramount to language theories (Perniss, 2018), which left no room for the multimodal exploration of language use. However, contemporary research has uncovered new evidence in favor of a paradigm shift regarding the current theories of language. Theories are too narrowly constructed in their failing to integrate the multimodal aspects of language that reflect the real-world uses of the human capacity for *doing language* (Kendon, 2008; Shaw, 2013, 2019).

One way to start working toward that goal is by (re-)conceptualizing gesture, what it *means* and what it *does*, in language, regardless of the modality in which it occurs. This chapter has introduced a number of studies that has begun to consider gesture and sign on common ground, highlighting similarities rather than differences. These researchers have shown that when letting a wider range of (other invisible) gestural phenomena enter the scope of analysis, the dichotomy between gesture and sign, the non-linguistic and the linguistic, cannot be sustained. The model accounting for a divide between the two is not sufficient for explaining the plethora of semiotic practices that deaf and hearing language users rely on to create meaning in their discourse and communication.

To this end, the current research aligns with these previous researchers' claims (e.g., Andrén 2014; Cibulka, 2015; Kendon, 2008; Müller, 2018; Shaw, 2013, 2019) that emphasize the need for mor cross-linguistic work focusing on commonalities between SpLs and SLs. While I do not depart per se from Enfield's (2009) composite utterance as a unit of analysis as Shaw (2013) did, the forthcoming analyses address several manual forms, namely, PU, IFE-G, and manual holds along with the accompanying directions of gaze as inherent and relevant embodied instantiations of composite meaning constructions (Enfield, 2009) in LSFB signers' and BF speakers' conversational discourses.

Ultimately, by exploring gesture and sign side-by-side in conversational interactions, it is possible to highlight the ways in which signers use specific gestural forms to regulate the flow of their interaction and the signer-addressee relationship, and how these strategies compare to those deployed by speakers. In doing so, it is hoped to achieve a better understanding of the ways individuals engage and organize their talk in interaction through their whole body, regardless of modality, and reinforce the argument for gesture's legitimate place *in* language.

Part II

Methodological Framework

FOR COLLECTING, ANNOTATING, AND ANALYZING DATA IN SPOKEN AND SIGNED INTERACTIONS

The first part laid the foundations for the theoretical presentation of this research. The second part is now devoted to the thorough description of the methodology adopted throughout this project for the forthcoming analyses, which will plunge the reader into the interactive nature of the bodily behavior of LSFB signers and BF speakers in Belgium. Firstly, the larger picture into which the present dissertation falls is succinctly outlined by introducing a brief state of the art of corpus linguistics, with a particular focus on the increasing importance of multimodal corpora and their limitations. Secondly, the three corpora under investigation are described: the CorpAGEst Corpus (Bolly & Boutet, 2018), the LSFB Corpus (Meurant, 2015), and the FRAPé Corpus (Meurant et al., ong.). In this chapter, information regarding the background for data collection, participants, tasks and samples, as well as the procedure for data annotation and categorization is provided. In the same vein, the annotation template, along with the different tiers in the ELAN software, are outlined. Thirdly, the procedure to annotate both formally and functionally the different elements in the data is presented. Some methodological difficulties encountered during the annotation process when it came to studying components in two different modalities, and how these issues were ultimately overcome, are also discussed. Finally, a last section is devoted to the presentation of the forthcoming analyses and the statistical tests.

CHAPTER 2
Data Presentation and Annotations

1 The Corpus beyond its Traditional View

Corpus Linguistics (CL) is a relatively recent discipline within the branch of linguistics, whose focus is on the study of "language based on examples of 'real life' language use" (McEnery & Wilson, 2001, p. 1).

A corpus traditionally consisted of spoken and/or written material. With the advent of technological and software innovations, however, there has been a change toward this original definition. Modern corpora are no longer limited to presenting data in the unique physical format of written transcribed texts and/or spoken forms for the analysis of linguistic phenomena, that is, as mono-modal corpora. Rather, they integrate different kinds of attested linguistic materials, which include written, spoken, and multimodal – consisting of sound and video – materials. In other words, CL's research goals have expanded. Furthermore, such methodological advances have made it possible for the discipline to investigate a broader range of research questions (see Allwood, 2008, for an overview). The first turning point occurred in the 1970s, when CL's goals went from investigating written material to studying spoken data. Yet, one of the shortcomings of those corpora at the time was that they did not offer any possible investigations of linguistic phenomena that included gestural aspects of language. Yet, the human language ability is multimodal in nature as individuals use all kinds of semiotic resources available to them to interact with each other, as argued in the theoretical framework of this dissertation (see Chap. 1).

In other words, recent years have seen the emergence of new sorts of corpora. As argued by Abuczki and Ghazaleh (2013), CL "research interest has recently shifted to the study of multimodal interaction and its capturing in corpora" (p. 86) to reflect language in use, so that even SL corpora are increasingly becoming part of this new cohort. Given the relatively special nature of multimodal corpora, it seems legitimate to reflect upon the notion of what constitutes a multimodal corpus, and the underlying concept behind it: multimodality. Next, the following questions are addressed: what are multimodal corpora and what does "multimodality" refer to?

1.1 Going beyond: Multimodal corpora

Schembri and colleagues' (2013) conception of a corpus partly adopts McEnery and Wilson's (2001) definition of a corpus that is defined as "a representative collection of language samples in a machine-readable form that can be used to study the type and frequency of linguistic units" (p. 2). Corpora, including SL corpora, are thus "machine-readable datasets of language recordings collected from large samples of signers [and speakers], which provide spontaneous, naturalistic data against which existing and future claims about the structure and use of specific […] languages can be tested" (Schembri et al., 2013, p. 137). In the above-mentioned definition, it seems that the notion of multimodality is implied. In this dissertation, three types of multimodal corpora are used. They are characterized as digitized collections of audio- and video-recorded sessions of human communicative behavior involving transcriptions of speech (and ID-glosses for LSFB) along with the inclusion of manual and non-manual movements (e.g., gaze direction) of the participants present in the recordings. A multimodal corpus, in other words, is a computer-based gathering of language-related material, which draws on data from more than one modality. Yet, this approach is somewhat ambiguous in the sense that it does not thoroughly reflect what the term "modality" means or refers to. The following lines shed light upon this notion of multimodality.

First of all, when attempting to grasp the meaning of the term "multimodality", I encountered a myriad of ways in the literature, as expressed by Lund (2007), referring to a plethora of phenomena including:

> emotions and attitudes conveyed through prosody, applause, laugher or silence [...], body movements, object manipulations and proxemics, layout and posture. [...] The term multimodal is also often used to signify the medium in which a particular message can be expressed, for example text and graphics. (pp. 289-290)

According to this quote, there are two meanings of "multimodality" to take into account. First, the medium of expression, that is, the processes of meaning making that encompass the bodily behaviors characterizing human language ability as multimodal, viz., the embodied and combined linguistic phenomena that emerge from the oral and visuo-spatial modality. Second, multimodality also points to "media", that is, "the physical mode(s) in which these elements are conveyed" (Knight, 2011, p. 2). Therefore, "while multimodal behaviors (in interaction) are involved in the processes of meaning generation, the multimodal corpus is the physical repository, the database, within which records of these behaviors are presented" (p. 3).

Although the building and usage of multimodal corpora are still in their initial stages (compared to the exploitation of mono-modal corpora), such incorporation of text, audio, and video into one dataset offers new grounds for the exploration of linguistic phenomena by providing a more comprehensive and accurate depiction of human communicative behavior reflecting real-life language use.

However, there exist some limitations to the use of multimodal corpora. The first of two major challenges concerns the very exhausting and time-consuming process of annotating the data (see Abuczki & Esfandiari Baiat, 2013). Yet, over time, there have been some improvements in the recording and processing of such data thanks to advances in technology. The second challenge is a lack of coherence as regards existing annotation standards (viz., tools, formats, and schemes) (Schembri & Crasborn, 2010). It is true that adding multiple layers or levels of annotation to account for the multi-linearity of gestural phenomena is more time-consuming and represents a technical challenge as is the case, for instance, when having to properly account for gestural motion itself. Moreover, "strategies and conventions used to record, mark-up, code, annotate and interrogate multimodal corpora vary dramatically from one corpus to the next" (Knight, 2011, p. 403). A last important aspect deals with the availability and (re)usability of these corpora. Work needs to be done in this regard as few multimodal corpora have been made publicly available. As highlighted by Brône and Oben (2015):

"even now truly multimodal corpora including visual as well as auditory data are notoriously scarce" (p. 195). Hopefully, these shortcomings will be overcome in the future.

1.2 Spoken and signed language corpora and projects

Not only has the surge in technological advances to exploit digital video data and the use of computer software to annotate multimodal data (e.g., ELAN, ANVIL, Transana, and EXMARaLDA) helped process the material for SpLs, but they have also provided an incentive for documenting SL uses. For this dissertation, only a selection of existing projects collecting and analyzing SpL and SL corpora is presented below, first for SpL corpora and then for SL projects. It needs to be highlighted that the following description does not exhaustively list all existing projects (see Allwood, 2008; Knight, 2011, for a review).

Despite the lack of common standardized coding schemes and few semi-automatic annotation techniques, a series of projects collecting and annotating video data of spoken languages have begun to emerge.

The first project to be mentioned is the Nordic NOMCO project, which is "the first collaborative work directed to collect comparable Nordic multimodal corpora" (Paggio et al., 2010, p. 2968). This project gathers multimodal corpora that are annotated to conduct research on the communicative functions of feedback, turn-management, and sequencing in the following languages: Swedish, Danish, Finnish, and Estonian. The data are collected from different social activities including first encounters, group interactions, formal meetings, and informal conversations. The NOMCO project stems from an earlier incentive launched by the Multimodal Interfaces MUMIN (2002-2004) network that examined and continues to examine multimodal resources in interaction. The annotation scheme involves the following articulators: the head, facial expressions, body posture, and manual gestures, as well as their functional analysis. One of the goals of the project is to use machine-learning techniques to provide a supportive system for the automatic recognition of gesture production (Paggio et al., 2010), which is an attempt at seeking a solution to one of the shortcomings previously mentioned.

Other spoken multimodal corpora involving annotations and processing of bodily phenomena are the HuComTech and AMI corpora. The HuComTech Corpus (Hunyadi et al., 2018) is a 50-hour corpus that collects formal and informal dialogues in Hungarian. The data are annotated on multiple levels, including syntactic, prosodic, and pragmatic annotation of speech and gestural phenomena. Similarly, the AMI Corpus, or Augmented Multi-party Interaction Corpus (Carletta et al., 2005), focuses on the collection and annotation of human interaction in meetings. A total of 100 hours of video data are recorded, out of which 35 are naturally occurring and 65 are elicited as part of a scenario. This project constitutes a large corpus of multimodal data. Yet, the sessions are conducted in English while participants are non-native English speakers. Due to this aspect, a higher proportion of speech irregularities are present in the data in comparison with other corpora. The annotations are based on the following patterns: speech, head and hand gestures, as well as gaze direction.

The TOMA project, standing for Tools for Multimodal Annotation, aims to collect, annotate, and analyze dialogue corpora adopting a multimodal approach to linguistic phenomena in French (from France). More specifically, the project provides a thorough description of different parameters used in naturally occurring interaction, which “requires corpora annotated in different domains” (Blache et al., 2009, p. 38), namely, phonetics, morphology, syntax, prosody, discourse, and gestures. Stemming from the TOMA project is the CID Corpus – Corpus of Interactional Data. CID is the first multimodal annotated corpus in French, composed of eight hours of video recordings containing 110,000 words by eight speakers. TOMA distinguishes itself from the rest of the multimodal projects by the richness and comprehensiveness of its coding system.

In the Flemish part of Belgium, the Leuven research team developed a multimodal corpus called InSight Interaction Corpus (Brône & Oben, 2015), in Flemish, bringing a new dimension to the tradition of multimodal corpora on two levels. First, the authors designed the recording setting so that they obtained a full 3-D panoramic view of the participants’ manual gestures, facial expressions, and body posture. Brône and Oben (2015) wanted to counter the “static external camera perspective that is generally used in video corpora (with a profile or frontal shot of the interlocutors)” (p. 195). The result consists of a recording obtained from a multi-angle perspective combining data from “an external camera with those of state-of-the-art head-mounted cameras and eye-trackers worn by both interlocutors in a dyadic interaction” (p. 196). The corpus is composed of 15 conversations of 20 min. each. Transcriptions and annotations of the sessions are conducted using the Praat system for speech and the ELAN tool for gestural and gaze phenomena.

Lastly, a final set of data worth mentioning for its considerable size and the inclusion of a large number of older adults from a wide range of backgrounds is the Carolinas Conversations Collection (CCC Corpus, Pope & Davis, 2011), which comprises a large collection of transcribed audio and video recordings in American English. The overarching aim is to examine the language of older and oldest-old men and women with and without cognitive impairment. Practically speaking, the corpus is composed of two cohorts of speakers: the first group (1) includes participants who are 65 years old and over, and suffer from dementia, mostly the Alzheimer’s type. This group is interviewed over time (up to 10 times) by students or researchers who go to the older person’s residential home. The second group (2) is made up of unimpaired participants who are also 65 years old and over and who discuss topics with their peers of a similar age and ethnic group, or with younger professionals from the medical field. The tasks include both spontaneous and elicited kinds of conversations (Pope & Davis, 2011).

As regards SLs, the first SL corpora were gathered in the early 2000s adopting a sociolinguistic approach (e.g., ASL) (Lucas et al., 2001). Following these first projects, many other SLs were documented in Europe. SL corpus linguistic research included the following corpora: the NGT Corpus, the BSL Corpus and the STS Corpus, all of which were collected between 2003 and 2004 as part of The European Cultural Heritage Online (ECHO) project (Nonhebel et al., 2004). A few years later, other corpora were gathered such as the Auslan Corpus (Johnston & Schembri, 2007) and another NGT Corpus created by Crasborn and Zwitserlood (2008). Also, Belgian corpora included the VGT Corpus[10] (2012-2015) and the LSFB Corpus[11]. Many other languages have been collected as well: Polish, Japanese, Danish, Finnish, Catalan and Norwegian. There is a very comprehensive overview and description of all the SL corpora projects, which is available at: https://www.sign-lang.uni-hamburg.de/dgs-korpus/index.php/sl-corpora.html.

1.3 Shared and specific features between spoken and signed corpora

SL corpora share several characteristics with SpL corpora. Both include video data along with the corresponding metadata about the informants and details of the conditions under which data was collected (Johnston, 2010), as well as annotations.

Given the visual-gestural nature of SLs (and SpLs when considering all bodily behaviors accompanying speech), high definition cameras are necessary to capture the complex multimodal dimensions of all the articulators used in these languages, in particular for the capture of small movements performed by the eyes, eyebrows, mouth, cheeks, and the like. Therefore, no fully anonymous data can be collected in that the face is exposed to cameras all the time. All of this also holds true for the annotation of multimodal phenomena such as gestures in SpLs. Similarly, the setting of all the recording materials has implications for the corpus design and data collection. Because of the importance put on this "digital" setting, it must be assumed that this affects spontaneity in the discourse productions of signers and speakers, at least at the very beginning of the recording sessions where more discomfort might be felt by the participants.

There has been a tradition in SpL and SL research to collect data using narratives, including storytelling, as tasks in experimental and controlled settings. This kind of approach to linguistic description, however, only covers a limited view of signers' and speakers' use of language. With the emergence of large-scale corpora and the recognition of a theory of language describing real interactions in real-world settings, such as professional meetings revealing workplace practices (e.g., Mondada, 2007), datasets have included a wider range of different types of discursive genres and participant profiles. As such, human communication can be represented in its entire complexity, offering a better perspective on real language uses.

Therefore, the selection of participants for the construction of multimodal corpora, both spoken and signed, needs to be representative also of all the varieties of signers and speakers using the target language in question. In SpL research, depending upon the research objectives and excluding the field of Second Language Acquisition (SLA) in which learners of the target language can be selected to be part of the corpus collection, the majority of participants in the corpora are native speakers (but see Mesch & Schönström, 2018, for a Learner Corpus of SL in Swedish SL). In SL, when tackling the issue of participant selection, the researcher must recognize different signer profiles. One of the issues is that only a small number of signers are native signers (5-10%). Moreover, the number of these 5-10% who were born into deaf families with parents as native signers themselves is even smaller (Meurant & Sinte, 2013). As a result, focusing on collecting native signer data does not capture nor

[10] https://www.corpusvgt.ugent.be/
[11] https://www.corpus-lsfb.be/

represent the varieties of the usage of the SL. One solution to this has been to collect data including two types of signer profiles, namely, native signers and near-native signers. Near-native signers are individuals who have acquired a SL at an early age (between three and seven years old), have been educated in a school for the deaf, and use SL to communicate daily, or have been part of the Deaf community for a long period of time (Van Herreweghe & Vermeerbergen, 2012). A third group of signers includes late signers who were born into hearing families and went to schools with hearing individuals. Then, depending upon scholars' research objectives and questions, different studies can be conducted on the different varieties either of participants or genres (see, for instance, Notarrigo, 2017).

Given the information mentioned, it is crucial to collect metadata regarding the participants (speakers and signers) that include their age, sex, region, age of language exposure, education, knowledge of other languages, and the like. Metadata regarding the recording sessions can include the types of discursive activities conducted during the sessions, the material used, and the setting.

Once video material has been collected and digitized, annotations need to be carried out so that they can be queried by a computer. On that dimension, SL corpora bear similarities to spoken multimodal corpora that also involve face-to-face interaction and spontaneity in producing linguistic material. To put this into practice and process data, ELAN, a multimodal annotation tool, can be used to perform annotations. It is a free and open-source software, which enables annotations of SL and SpL data. It was developed at the Max Planck Institute for Psycholinguistics in Nijmegen, The Netherlands, "with the aim to provide a sound technological basis for the annotation and exploitation of multi-media recordings" (Tacchetti, 2013, p. 7). This allows annotation of audio and/or video resources with accuracy and is specifically suitable for multi-level and multimodal annotations of language, gestures, and SLs.

However, SL corpora annotations possess their own specificities, and differ from spoken corpora annotations. Because of the lack of any writing and phonetic transcription system, some important specificities of SL corpora have emerged in the annotation process. They are the concepts of ID-gloss and lemmatization. In the field of SL linguistics, an ID-gloss takes the form of a unique label which corresponds to an approximate and consistent written word from a SpL such as French, English, and so on. The ID-gloss represents all the phonological and morphological variants of a given lexical unit through the lemmatization process. ID-glosses do not reflect all the exact possible meanings of a given sign nor do they provide its exact grammatical function. Thus, an ID-gloss can be defined as "conventionalization for consistently using the same written word label for a specific sign, making it a necessary feature of a useful sign language corpus (Johnston, 2010, pp. 119–120, as cited in Mesch & Wallin, 2015, p. 103). To illustrate this, the ID-gloss MOM[12] represents the sign whose meaning refers to "mom". However, the ID-gloss ENGLAND[13] can be used for the signs meaning "England" or "English" independently of its exact grammatical class as a noun or an adjective, and regardless of its meaning (see Cormier et al., 2012).

In other words, lemmatization is a useful process that enables researchers to navigate the corpus to find relevant information during a corpus enquiry by identifying lemmas, viz., all occurring forms of morphological variations of a given sign. Examples

12 Using small capitals is a standard practice for representing sign gloss in the text. A word in double quotation marks refers to a French or English translation (Mesch & Wallin 2015, p. 103).

13 This example is drawn from Fenlon et al. (2013, p. 76)

of projects working as such include Johnston's (2010, 2015) for Auslan and Konrad's (2013) for DGS. Lemmatization only works for lexical signs and not depicting signs, for example, which are not fully lexical. In the LSFB Corpus, the label "DS" was annotated on the corresponding tier (see LSFB conventions at: https://www.corpus-lsfb.be/).

In the present research project, annotations of the LSFB Corpus follow Johnston's (2010, 2015) principles of attributing an ID-gloss to label each sign throughout the corpus, independently of its meaning in the context. In the corpus, the LSFB collaborators, working at the LSFB-Lab, annotated ID-glosses for both hands. Thanks to this consistent ID-gloss method, the annotations in the corpus were used in a productive fashion and the conversion of the corpus into a machine-readable format (Barberà Altimira, 2015, p. 8) was made possible. In addition, translations of the corresponding SpL, viz., the Belgian variety of spoken French, were performed on separate tiers. Up to now, roughly seven hours of translated material have been completed. This work is ongoing. The figure below illustrates a translation from LSFB into French. An approximate translation of the glosses into its English equivalents, which would be SHORT STRONG DEAF TRUE PT:DET LONG, are translated as "deaf people are more explicit, it's true" [in their way of expressing themselves in comparison with individuals who speak].

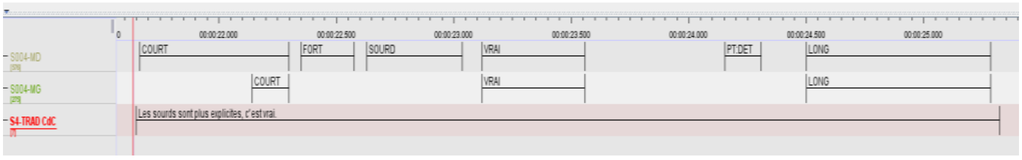


Fig. 2: Illustration of a translation in the LSFB Corpus, Task 04, S004 (00:21.639-644).

As regards the transcription of speech in SpL corpora, see section 3.3.1 for the transcription guidelines in FRAPé and CorpAGEst adopted in the present framework.

In sum, explorations of communicative resources in the different modes of expression, viz., the different modalities of human interactions, are made possible thanks to the use of multimodal corpora. These corpora provide a more accurate and comprehensive description of a wider range of linguistic phenomena. The approach adopted in this research project relies on the use of three multimodal corpora: the CorpAGEst Corpus, the LSFB Corpus, and the FRAPé Corpus. Each corpus incorporates language data not only consisting of text but also sound (except for the LSFB Corpus) and visual elements to fully embrace language as it is used in various communicative contexts. In the following section, the data are presented.

2 Data: Corpora Presentation

This dissertation draws on data from three multimodal corpora: (1) the CorpAGEst Corpus (Bolly & Boutet, 2018), (2) the LSFB Corpus (Meurant, 2015), and (3) the FRAPé Corpus (Meurant et al., ong.). The first two corpora that were directly available for analysis were the LSFB and CorpAGEst corpora. However, they are not directly comparable. Therefore, FRAPé is the other spoken multimodal corpus used in this dissertation for which new data was collected in order to compare the data from the LSFB Corpus with the corresponding multimodal data from its spoken counterpart, the FRAPé Corpus. Comparing data from the LSFB and FRAPé corpora constitutes the first multimodal cross-linguistic analysis between a SL and a SpL within the French-speaking/signing community in Belgium. Nevertheless, FRAPé also bears similarities to its other spoken multimodal counterpart in BF, CorpAGEst, regarding the dialogic and conversational nature of the tasks and the age of the participants. Yet, it also differs from it in that the data were collected in a lab setting while CorpAGEst participants were recorded in their homes. Still, FRAPé and CorpAGEst both reflect how multimodal BF is used by older adults in French-speaking Belgium.

In the following section, the corpora are introduced with a description of their data including participants, tasks, and samples. The second part of this section is devoted to the description of the method, which includes the annotation protocol for the formal and functional typology used to conduct the forthcoming analyses (in Part III).

2.1 The CorpAGEst Corpus

2.1.1 Overall project presentation

The CorpAGEst Corpus was created as part of the European funded two-year Marie Curie CorpAGEst project (2013-2015) entitled: *A corpus-based multimodal approach to the pragmatic competence of the elderly* (Bolly & Boutet, 2018). The originality of the project lies in several aspects regarding linguistic research including its innovative research topic, its corpus-based multimodal approach to natural linguistic data, and its reliance on data elicited in an authentic environment rather than in experimental conditions (e.g., in a lab).

The idea at work behind the project is to explore the pragmatic dimension of the language ability of healthy (non-pathological), aged individuals (75 years old and over) through the analysis of verbal and gestural markers and, more precisely, discourse markers and pragmatic gestures. For instance, it is argued that verbal utterances such as "you know", combined with other embodied features corresponding to manual and non-manual aspects such as "an exaggerated opening of the eyes" are markers of stance. Stance refers to "the cognitive and affective ability to express and understand points of view, beliefs and emotions, as to be in tune with others and to interact with them" (Goodwin et al., 2012, cited in Bolly & Boutet, 2018, p. 1). Through multimodal analyses of these combined markers of meaning – verbal and gestural – the project hopes "to better characterize language variation and communication abilities in later life" (Bolly & Boutet, 2018, p. 1).

2.1.2 Data collection

The aim of this project is to reflect language use as closely as possible to the way older adults make use of language when they are in a natural and familiar environment. Therefore, the corpus data are made up of audio and video conversations recorded at the participant's home or in a residential setting in French-speaking Belgium, and include videos of the participants engaged in semi-directed interviews with a younger addressee (e.g., a daughter or granddaughter). The CorpAGEst Corpus has a transversal part, which comprises 18 face-to-face interviews of 16.8 hours in total (60 min. on average per interview) of approximately 250,000 words in BF recorded from nine older speakers (eight women, one man). This contrasts with methods used in the fields of psychology and language pathology of aging, where most data are collected under experimental conditions.

Then, as an extension of CorpAGEst, there is the VIntAGE Corpus, which adopts a longitudinal and clinical perspective (Duboisdindien et al., 2019). This corpus falls within the framework of CorpAGEst but with its own specificity: it consists of interviews based on reminiscence tasks carried out in French French. Each interview is replicated several times in the course of a year and a half. The reminiscence tasks connected to past events are contrasted with tasks about current topics in connection with present life. The aim of the VIntAGE Corpus is to observe whether changes in the verbal and/or gestural behavior of older individuals tend to occur over time. The analyses presented in this dissertation's framework are conducted on a selection of the transversal corpus in BF (see the participants' description below), and not the VIntAGE Corpus.

2.1.3 Participant selection

Several variables including the type of environment (at home *vs.* a residential setting), the kind of relationship maintained between interlocutors (familiar *vs.* unknown addressee), the tasks (past *vs.* present-life) along with the type of interaction (e.g., date, place, duration), the interviewer, and the interviewee information (e.g., sex, education, profession, language(s), geographic origin, etc.), among other elements, were taken into account for data collection. In total, nine informants took part in the CorpAGEst transversal study, out of which four female speakers were ultimately selected for analysis (see Table 1 for their description). In CorpAGEst, most participants were women (with only one man). The youngest was 75 and the oldest 95 (mean age: 85). All participants were native speakers of Belgian French.

The participants selected for the study had not experienced any major injuries and didn't have any cognitive impairments (focus on "non-pathological" individuals), as corroborated by the results of the Montreal Cognitive Assessment (MoCa) test (Nasreddine et al., 2005) conducted at the time of data collection (a score considered as normal is ≥ 26/30). The French version of the Interpersonal Reactivity Index (F-IRI) questionnaire (Gilet et al., 2013) was also used to assess their empathic skills. In CorpAGEst, four female speakers recorded in their homes with a family member were chosen to be analyzed for the present study. The table below brings out the related information for these participants:

Code[14]	**Pseudo.**	**Gender**	**Age**	**Origin**	**Education (in years)**	**hh:mm:ss**
C001	**AgeBN1**	F	75	Luxemburg	12	1:01:14
C002	**AgeDA1**	F	84	Namur	14	0:59:07
C003	**AgeLL1**	F	79	Namur	12	1:13:41
C004	**AgeSM1**	F	89	Walloon Brabant	9	0:51:14

Table 1: Metadata presentation of participants from the CorpAGEst Transversal Corpus.

[14] For the remaining of this dissertation, the code attributed to each speaker in CorpAGEst corresponds to the pseudonym of the participant established in the original version of the CorpAGEst project. This new code (e.g., C001) was given to each speaker in order to ease the reading when comparing CorpAGEst participants with FRAPé speakers (e.g., F001) and LSFB signers (e.g., S001).

2.1.4 Tasks and samples

Tasks for the analyses correspond to productions that are as close as possible to natural discourse. In CorpAGEst, topics for conversation deal with past and present events. Each individual was interviewed twice and each interview was further divided into two subtasks: one focusing on the description and conversation of past events (such as milestones in aging), and a second providing explanatory insight into the actual life of the older person (such as self-perception of aging). The interviews were semi-directed but the addressee was free to take part in the conversation at any moment. Depending on the interview type, the speaker either spoke to a familiar member of her/his family (Interview N°1) or an unknown person (Interview N°2). The following sampling has been performed following these methodological principles and is summarized in Fig. 3:

❖ **Sample 1** (from Interview N°1) consists of selecting the first five min. of every first interview. The objective is to explore how speakers behave when they are in a new communicative situation.

❖ **Samples 2 and 3** (from Interview N°1) include one excerpt of five min. each during the middle of the first part of the interview (Task 1A: focus on the past) and the second part (Task 1B: focus on the present time). Samples 2 and 3 are the ones selected for the current analyses.

❖ **Sample 4** (from Interview N°2) gathers one excerpt of five min. from the second part of the second interview (Task 2B), whose topic deals with their perception of places to live. The aim is to compare, on the one hand, samples 4 with each other (dependent variable: individuals) and, on the other hand, to compare them with the corresponding sample 3 (dependent variable: type of social tie between interlocutors).

Task Type	Interview N°1 (with a familiar person)	Interview N°2 (with a stranger)
Task A: Descriptive: Focus on past events	Task 1A: Milestones in aging	Task 2A: Milestones in progress
Task B: Explicative: Focus on present-day life	Task 1B: Self-perception of aging	Task 2B: Self-perception of everyday environment

Fig. 3: Tasks for the transversal corpus data collection (Bolly & Boutet, 2018).

The samples for the present research match sample 2 (S2) and sample 3 (S3) from Interview N°1. These were chosen as a comparable alternative to the content of the tasks selected in the LSFB and FRAPé corpora. In total, roughly 45 min. of video data were fully annotated and analyzed by myself at the following levels of analysis for the entire set of participants: speech transcriptions, turns-at-talk and overlaps, gaze directions, manual movements, including holds, PALM-UPS, Index Finger-Extended Gestures, and their respective functions (macro- and micro-functions of language) (see sections 3.2 and 3.3 of this chapter).

2.1.5 Interview procedure

A first contact was established with the participants, who willingly agreed to participate in the study. This represented a crucial aspect because it highlighted their motivation, and revealed their personal commitment to talk about their life experiences while on camera. The participants were told that the overall theme of the interviews addressed older adults' communication skills so that they would not limit their gestures when speaking.

The room at the older person's home in which the interviews took place was kept as close as possible to reality since the aim is to observe language production in real-world settings. The only changes that were made were for technical reasons (e.g., no noise, enough light). Though slightly slanted, the seats – if needed – were placed in the room in such a way that speaker and addressee could face each other during their conversations. The interviewer was always placed on the left side of the screen and the interviewee on the right side (see Fig. 4 below). Furthermore, an attempt was made to avoid seats with armrests so that a relatively high degree of freedom was kept for the person to move unencumbered. However, comfort and the older adult's habits taking precedence over this environmental constraint, armrests were present in the case of three out of four of the focal participants.

Regarding the technical material, a couple of three-legged cameras were used. The first camera, adopting an American shot (see below), was placed facing the older adult's face (including the head, torso and thighs) while the second camera included both participants in the field of vision so that both faces and the entire body were made visible (Fig. 4). Moreover, after a first interview phase where the sound quality was not optimal, a one-entry microphone and two Lavalier microphones were installed.

Fig. 4: American shot (left) and field vision (right) in CorpAGEst, S3, C001.

The design of each task follows a specific chronology. Each sequence starts with a general prompting question on the theme addressed (past *vs.* present event). In Task 1B, for example, the participant is asked what her/his own perception of aging is and what the necessary components to "age well" in today's society are. Then, the addressee is asked to keep the conversation going with a prepared set of related questions such as "Do people sometimes ask how old you are?" The interview ends on a final note asking if the speaker wishes to add something. The interviews are semi-directed but the questions are designed in such a way that a conversational, relatively spontaneous type of interaction can be elicited.

2.1.6 Summary

Out of the nine participants in the CorpAGEst project, four female speakers were ultimately selected for the current analyses. Annotations and analyses were conducted on specific extracted samples of video data (samples 2 and 3), chosen from among all the samples in the transversal corpus. These two samples formed part of Interview Nº1 exploring present and past events. All conversations took place with a familiar addressee, mostly a family member. Ultimately, a total of approximately 45 min. of data were annotated and analyzed.

2.2 The LSFB Corpus

Linguistic research on LSFB is a relatively recent endeavor. The first doctoral research took place in 2006 (Meurant, 2008). This can be partly explained by the fact that methodological and technological advances, which allowed for more accurate descriptions and analyses of SLs, particularly with a focus on discourse-related aspects of linguistics, only occurred around that time. Some of the works which have been conducted on the description of LSFB thus far have tackled issues related to the roles of gaze (Meurant, 2008) and aspects of time (Sinte, 2013). Others have worked on the analysis of (dis-)fluency markers in LSFB (Notarrigo, 2017), on the contrastive analysis of discourse markers in LSFB and LSC productions (Gabarró-López, 2017), and the phonological variations across registers (Paligot, 2018).

2.2.1 Overall project presentation

The LSFB Corpus[15] (Meurant, 2015) is an open online database created between 2012 and 2015 containing approximately 150 hours of LSFB productions of 100 signers, both male and female, from 18 to 66 years of age (and over), who come from diverse regions of Belgium. The informants grew up in different parts of Belgium and their profiles varied between native, near native, and late signers of LSFB. Native signers were children of deaf parents whose acquisition of sign language was made between zero and three years old. Near natives ("early learners") were signers comprised of children who were exposed to LSFB during their first years of education. Late signers (or "late learners") were those whose acquisition was made from eight years old and upwards (see Gabarró-López, 2017, p. 41; Notarrigo, 2017, p. 25). The socio-linguistic profile of the participants was thus very diverse. The only constraint, however, on the recruitment process was that participants had to use LSFB as their main language in daily life.

The aim of the corpus is to document the language and its different varieties as used by the deaf community in the French-speaking part of Belgium. To provide a representative sample of the LSFB language, the description of the different varieties is concerned with genres, registers, and signers.

15 The LSFB Corpus is the result of an Incentive Grant for Scientific Research (n° F.4505.12) entitled *Creation of a referential corpus for the study of French Belgian Sign Language (LSFB).*

2.2.2 Genres and registers in the LSFB Corpus

The originality of the project lies in the decision to include a wider range of discursive genres, not only narratives. Narrative production is the most prominent discursive genre represented in SL corpus data. However, as mentioned by Meurant and Sinte (2013), "the linguistic structures present within narratives do not have the same frequency, and are not achieved in exactly the same way as within other discourse genres" (p. 9). Therefore, to achieve representativeness, the LSFB Corpus also contains descriptive, explicative, argumentative, and conversational productions. In total, 19 different tasks constitute data for the corpus (except for older signers – 66 years old and over – for whom the number of tasks was reduced).

Another peculiarity of the project is that it includes register variation from formal to more informal speech styles, including spontaneous conversations as well as prepared productions. The elicitation material used for the recording sessions at the LSFB-Lab (University of Namur) consists of prepared as well as non-prepared productions such as storytelling, free dialogues about the participants' lives, their tastes and experiences, discussions in relation to more opinion-based topics, as well as conversations and some exercises involving more reasoning.

2.2.3 Signers in the LSFB Corpus

A total of 100 signers originating from Wallonia and the area of Brussels and with different profiles took part in the project. Their productions ultimately resulted in roughly 150 hours of video recordings. The corpus included participants whose linguistic profiles varied between native, near native, and late language learners of LSFB. Such variety among the signers allowed for an evaluation of the effects of the different conditions of LSFB acquisition. Another variation was the signers' regional background. The following regions, namely, Brussels, Uccle, Berchem, Woluwé, Mons, Namur, and Liège, formed part of the corpus (see Fig. 5, below). Different age groups were selected and integrated into the corpus and particular attention was paid to gender parity between male and female participants as well (of the signers 43% were male and 57% female).

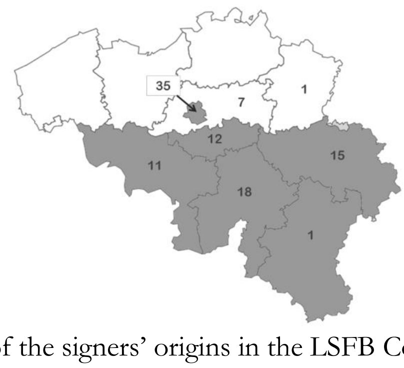


Fig. 5: Visualization of the signers' origins in the LSFB Corpus (Meurant, 2015).

Several linguistic profiles were taken into account: (1) native signers (30%), who are children of deaf parents and were exposed to LSFB from birth; (2) near-native signers (26%), who were exposed to LSFB only in their first years of school; and (3) late signers (49%), who were exposed to LSFB when they were between seven and nine years old and over. Moreover, four different age groups were distinguished: 18-25 (17%), 26-45 (49%), 46-65 (18%), and 66 and over (16%). This study is based on the last group.

2.2.4 Procedure of the interviews

The participants came in pairs to the LSFB-Lab at the University of Namur. The recording sessions lasted for an entire day. The corpus is made up of dyadic conversations between two deaf signers and a moderator, who provides the general guidelines in LSFB regarding the different tasks. The spatial disposition in the studio is set in a way so that informants face each other when interacting (see Fig. 6 below). There is one camera per participant which films from the waist up. A third camera captures the whole scene with both participants in shot. The dialogues were video-recorded using three cameras with only deaf individuals in the studio lab.

To elicit data for the LSFB Corpus (and the FRAPé Corpus) – with the exception of older signers – 19 tasks were recorded. Only four were chosen in this dissertation for their dialogic relevance. Participants were sometimes provided with images and/or videos in relation to the different topics discussed during the recordings in order to elicit different kinds of productions. The topics ranged from telling stories and childhood memories to eliciting differences between deaf and hearing culture, as well as discussing societal issues such as gay marriage. (Semi-) spontaneous conversations and discussions were also elicited.

The video samples were transcribed and annotated using ELAN by LSFB signers who use LSFB as their L1 and who work at the LSFB-Lab. The ID-gloss technique based on Johnston's (2010, 2015) annotation guide was used. The left and right hands were annotated on two separate tiers, in which each sign produced received an ID-gloss. A sort of tag was given to identify the value of a specific sign, which corresponded to a French word written in capital letters on the ELAN tier. Below is a screenshot illustrating the annotation grid in the LSFB Corpus:

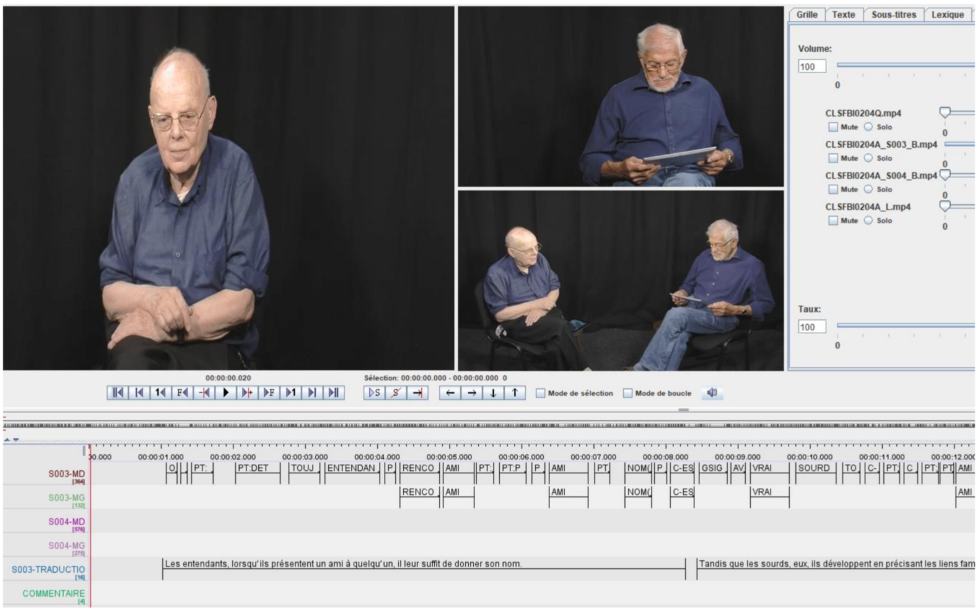


Fig. 6: Screenshot of an ELAN file from the LSFB Corpus, Task 04, S003-S004.

2.2.5 Task selection

Recorded conversation sessions for the analyses were selected from the online LSFB Corpus. The focus of this doctoral dissertation is to explore manual and gaze behavior in the context of ongoing interaction between older signers and speakers. The LSFB Corpus is composed of a total of 19 tasks, which all represent a variety of discursive genres (see section 2.2.2 above). Given the nature of the present research, which places the emphasis on the relatively free, spontaneous character of dialogues, tasks conveying such aspects were selected. Thus, in total, four tasks (03, 04, 15, and 18) were ultimately chosen. They are described below in terms of their potential for eliciting relatively free dialogue on different topics:

❖ The first task selected is about childhood memories (**Task 03**). The deaf moderator asks both signers to tell each other a childhood memory, either happy or not. Depending on the participants, the moderator may suggest to talk about their first encounter with a deaf adult (for signers whose parents are hearing), or the way a typical celebration takes place in a deaf family, e.g., birthdays or Christmas.

❖ **Task 04** is related to deaf/hearing culture. The moderator asks the informants to express their opinion regarding the advantages and disadvantages of being deaf or hearing. The moderator can provide a comic strip as a support to launch the discussion asking the participants whether what is represented in the comic strip corresponds to their own life experiences (or not), and to expand on and justify their answer.

❖ **Task 15** addresses the participants' hobbies, work, and passions. The moderator asks the signers to talk about their hobbies, their jobs and/or their passions by describing the materials used, the rules followed, and so on when they do these activities.

❖ **Task 18** includes signers comparing present and past events. In this task, signers in session 1 (S001-S002) talk about how they feel today compared to when they were younger and about how life is more expensive today. They also discuss how they met their husbands and how their families reacted. In session 2, signers S003 and S004 discuss technological advances (trains, cars, and so on). One participant mentions everything he used to do when he was younger.

In total, 86 min. of data were selected from the first two sessions that included the following participants: S001-S002 (women) and S003-S004 (men). They are presented next.

2.2.6 Participant selection

From the LSFB Corpus, two pairs of signers were selected. The participants are 66 years old and over. Both groups were equally divided by gender, two men and two women in each pair. In addition, each pair came from the same region in Belgium, that is, Liège for the first pair and Liège/Wolluwé for the second. Table 2 below provides an overview of the metadata including gender, age, region/origin, linguistic profile, whether they know another language and their dominant hand. The information below was retrieved from the metadata available on the LSFB Corpus website (https://www.corpus-lsfb.be/).

Code	Gender	Age	Origin	Linguistic profile	Other language	Dominant hand
S001	F	75	Liège	Late	No	Right
S002	F	67	Liège	Near native	No	Right
S003	M	83	Liège, Wolluwé	Native	Yes	Right
S004	M	74	Wolluwé	Late	No	Right

Table 2: Overview of the participants selected from the LSFB Corpus.

The participants were chosen regardless of their linguistic competence. Rather, external factors were taken into account, such as the presence of ID-gloss annotations[16] already available on the selected tasks as well as the age of the participants as I was looking for older informants to constitute the samples.

2.2.7 Summary

The data for the LSFB counterpart are composed of four tasks highlighting the dialogic character of conversations, and four signers. The data include one native male signer born into a deaf family and who communicates in LSFB with his family, another who is a near native female signer born into a hearing family (but who acquired LSFB before the age of six). She went to primary and secondary schools for the deaf. And lastly, two late signers (one male and one female) who were born into hearing families and who went to school with hearing individuals. Their LSFB acquisition took place after they were nine years old.

2.3 The FRAPé Corpus

Many research questions have motivated scholars to begin to address corpus-based, contrastive issues of various phenomena in SpLs and SLs, especially as regards the similarities and/or differences between the two kinds of languages (see e.g., Hodge et al., 2019). As argued in chapter 1 on the relation of gesture to language, these questions have often been made based on the precept of "language *vs.* gesture", that is, differentiating communicative bodily behaviors as a result of what is seen as linguistic *vs.* what is not (see Hodge et al., 2019). Yet, the approach taken in this dissertation is to favor common ground between the perceivable communicative bodily behaviors that occur in a signed and a spoken language. My aim is to observe the ways signers use the semiotic resources that are available to them, and how these can be compared to speakers' resources in an empirical fashion. There is an urgent need to compare multimodal composite utterances (Enfield, 2009) directly in speakers' and signers' conversations.

However, by the time this PhD had begun, no spoken corpus counterpart to the LSFB Corpus existed. Only a pair of speakers had been recorded at the university lab

[16] A warm thank you to my colleague, Sibylle Fonzé for annotating all the LSFB samples required to carry out this research.

in Namur under the same conditions as the LSFB participants, but there were no older adults (66 years old and older) who could form part of the present study. With the aim to compare data using contrastive multimodal analyses within and across two modalities and languages, a new corpus was built. The new created corpus is called FRAPé (standing for "*FRAnçais ParlÉ*", translated as "spoken French"). The following subsections introduce the specificities of this corpus in terms of participant and task selections. A point is also devoted to some methodological challenges experienced during the data collection of this corpus.

2.3.1 Participant selection for the FRAPé Corpus

In order to collect the data, the same protocol of the LSFB Corpus was replicated on six individuals in total who came to the university lab. For this dissertation, only two pairs of hearing female participants (over 66 years old) were ultimately selected for analysis. The reason for this is that one participant from one of the pairs suffers from Parkinson's disease. The informant was, therefore, excluded from the analyses. The four participants left constituted new data for the project. Comparing the data from FRAPé and LSFB will allow for the first multimodal cross-linguistic analysis between these two languages and modalities. The samples in FRAPé are comparable to those in LSFB in terms of genres, participants and recording environment, which will render the cross-linguistic and cross-modal comparison between both corpora possible when individuals are tested under the same methodological conditions.

Code	Genre	Age	Origin	Linguistic profile	Other Language(s)?	Dominant Hand
F001	F	85	Overboelare	BF native speaker	English, Flemish	Right
F002	F	70	Charleroi	BF native speaker	No	Ambidextrous
F003	F	68	Knokke	BF native speaker	English, German, Flemish, Spanish	Ambidextrous
F004	F	65	Liège	BF native speaker	No	Right

Table 3: Overview of the participants in the FRAPé Corpus.

2.3.2 Task selection for the FRAPé Corpus

Aurélie Sinte adapted the tasks of the LSFB Corpus to use for recording hearing participants in FRAPé. Four out of the five tasks selected for the present work did not undergo modifications and were kept identical to the LSFB Corpus' tasks, namely, Tasks 03, 15, and 18. The only exception was Task 04. Rather than explaining differences between deaf and hearing culture, FRAPé participants were asked to give their opinion about the situation in Belgium, and discuss the relationships between the Flemish and the Walloon. The moderator asked questions such as "In Belgium, do you believe it is better to be Flemish or Walloon?" A last task equivalent to LSFB's Task 18 was chosen. The emphasis was put on highlighting differences experienced by the participants between past and present situations in their lives.

2.3.3 Methodological challenges

Some methodological difficulties were encountered throughout the FRAPé data collection. First, multimodal annotation, in particular, is an extremely time-consuming process. As McNeill (1992) wrote, "just transcribing a gesture and getting the timing right can take 40 to 50 times longer than the gesture itself" (p. 1). It is an aspect that needs to be taken into account given that most of the work in this dissertation is dedicated to the annotation of gesture forms and functions in both languages (BF and LSFB). On the other hand, collecting new data as part of the FRAPé Corpus was also challenging. For example, finding participants older than 66 years old turned out to be a slightly more complex task than first expected as people were reluctant to participate. Once the participants were found, recording the sessions at the studio revealed how working with human beings and not robots could sometimes bring the unexpected. I had to redo a whole session and find a new pair of participants because one of the participants suffered from Parkinson's disease, a condition which affects a person's communication and language, and therefore, gestures. For ethical reasons I could not send him back home but I had to find another pair of participants. Once the data were collected for the corpora, the annotation procedure began. The next section provides a detailed account of all the methodological steps undertaken in the project.

3 Gesture Annotation and Categorization

Now that the three corpora have been described, it is time to introduce the annotation template for the formal and functional annotation process. To conduct the analyses on the selected bodily resources in signed and spoken interactions, this dissertation follows the framework proposed by Vermeerbergen and Demey (2007) to compare spoken and signed interaction by studying SLs and speech in combination with gestures in SpLs.

3.1 Preliminary remark

Language is not restricted to the sole expression of utterance content but also serves interactional purposes in the social world of everyday conversations. The overarching aim of this doctoral dissertation is to shed new light on the mechanisms that hearing and deaf language users deploy to interact with their partner to manage conversations. Therefore, before beginning the annotations in ELAN, a first important methodological step was to find common ground between SL and SpL data, that is, to select the units of analysis. One of the issues was the lack of studies examining interactive phenomena in SLs (Girard-Groeber, 2015). In order to list the units with a potential interactive role, I began to look for studies investigating interactive gestures in SpLs. Then, I searched for forms and movements occurring in both modalities and languages but that were not necessarily examined as interactive phenomena. Finally, I explored actual LSFB and BF data to observe whether the pre-selected forms would appear. Such a perspective followed an inductive approach (Bavelas et al., 2016) where new phenomena were discovered through the micro-observation of the data. To favor a common set of comparisons, four units were ultimately selected, namely PALM-UPS (PUs), Index Finger-Extended Gestures (IFE-Gs) (Jokinen, 2010), holds, and gaze direction. These tokens were chosen for their potential in playing a role in the management of social interaction in both languages, LSFB and BF, respectively.

3.2 Annotation protocol

As explained in the previous section, there were pre-existing annotations in the corpora performed prior to the current research project. For instance, all lexical signs in the LSFB Corpus were previously tagged with ID-glosses by deaf collaborators at the university lab, and translations into spoken French (Belgian variety) were made available as well. Speech was also transcribed for the CorpAGEst and FRAPé corpora. In addition to these pre-existing annotations, tiers were created in all ELAN files across the three corpora to conduct the analyses congruent with the objectives of the present dissertation. In total, 13 tiers were added to enable the study of the different types of movements performed by signers and speakers in order to understand the ways their interaction is managed through specific manual and non-manual markers. ELAN tiers were composed of different levels of annotations containing speech transcriptions and ID-glosses (for LSFB), translations, markers identifying speaking turns as belonging to the main speaker or main signer (L1) or the addressee (L2), overlapping talk/signing, gaze direction, types of hand movements, including holds, and the functional domains and categories characterizing the type of manual movement (Funct-D and Funct-C). Annotations were done separately for both hands, left (LH) and right (RH), respectively. Furthermore, controlled vocabularies, user-definable lists of values, were used for each tier, ensuring a more secure annotation process. In practice, all samples were annotated based on the formal characteristics of the articulators (section 3.3) and their functional meanings (section 3.3.6). The overall annotation procedure was performed on several levels, which are presented in Fig. 7 and all detailed in the following subsections.

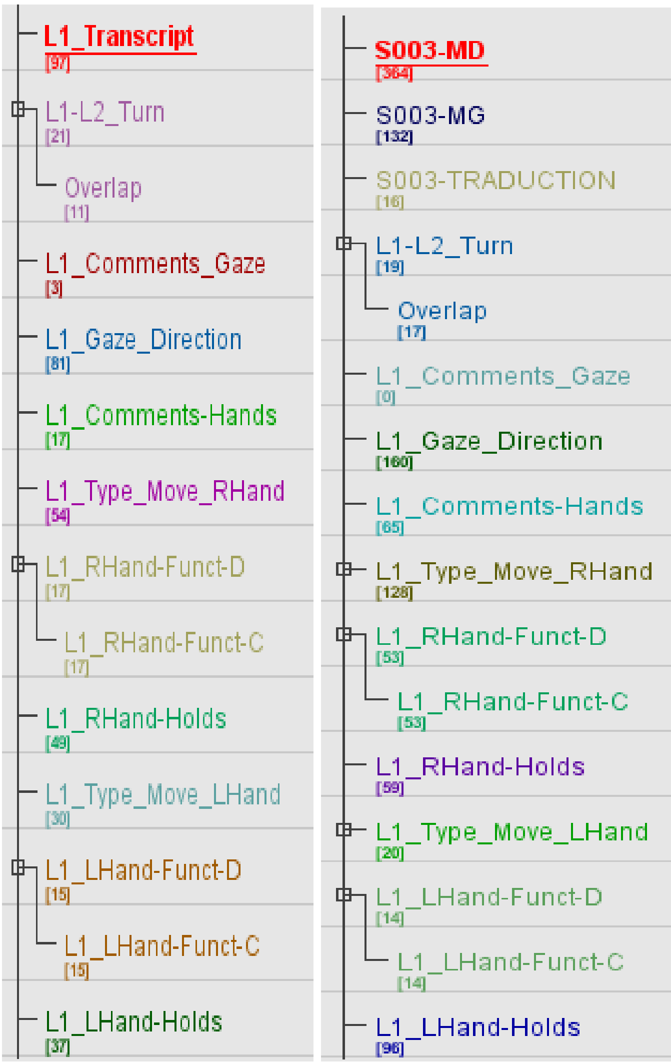


Fig. 7: Overview of tier hierarchies in ELAN for CorpAGEst-FRAPé (left), and LSFB (right).

One of the distinctions between both figures is that the tier hierarchies for LSFB contain two tiers for each hand, including one for the ID-gloss annotation while there is no such tier for the CorpAGEst and FRAPé corpora. Other than that, all tiers are the same across the corpora. The following section introduces the annotation scheme for each tier presented.

3.3 Guidelines per Tier

3.3.1 Speech transcription (in CorpAGEst and FRAPé)

Unlike the LSFB Corpus, the other two corpora – CorpAGEst and FRAPé – are composed of native hearing individuals of spoken French (Belgian variety). Therefore, to properly connect gestures with their linguistic context of production, speech was transcribed. Although not all the transcriptions were word-aligned, CorpAGEst transcriptions were already available prior to this work and were done using the Praat Software (Boersma, 2001). All transcriptions followed Valibel's transcription conventions (Bachy et al., 2007). Some minor changes, however, were conducted to meet CorpAGEst's research goals (see CorpAGEst annotation manual version 1.3, Bolly, 2016, p. 6). FRAPé's transcriptions were performed following the same principles as CorpAGEst's. All transcriptions were done by an intern[17] in linguistics at the University of Namur. She used the ELAN software to transcribe speakers' speech in FRAPé (see Appendix for the transcription conventions).

Articulator, Level	**Tiers** [Name] **in ELAN**[18]	**Description**
Transcription	**[L1_Transcript]**	[L1_Transcript] contains the transcription/translation of L1's speech
	[L2_Transcript]	[L2_Transcript] contains the transcription/translation of L2's speech

Fig. 8: Controlled vocabulary with the description for the Transcription Tier in ELAN.

3.3.2 Delimitation of turns and overlaps

Turns-at-talk (and their allocation) in any given language are the building blocks of social interaction. More than that, "to conduct a dialog in a language, one must know, in addition to the words and phrases of that language, the rules of interaction in the language" (Mesch, 2016, p. 22). This holds true not only for signers in signed interactions but also for speakers in spoken conversations. More particularly, a person engaged in a dialogue needs to be aware of different aspects ruling the turn-taking system. For instance, these aspects include knowing when to start a turn, how long to hold the floor before yielding the turn, what to do when talks overlap, as well as how to be an effective addressee through appropriate responses (e.g., in the use of backchannels, or the correct use of eye gaze patterns and gestural expressions).

The ways turns are organized (when one finishes, when a new one begins) is relevant to this dissertation to delimit boundaries for the gestural interactive phenomena under scrutiny. A specific concern, therefore, has been to determine where in the flow of signed and spoken talk a new turn ends and a new one begins. Especially in the case of SL conversation where a continuous flow of signs takes place: "the embedding of signs within the visuo-spatial unfolding of hands in motion implies that they are preceded by a preparation movement of the hands and followed by either a transition movement to a next sign or back to rest" (Groeber & Pochon-Berger, 2014, p. 122).

I delimited the signing and speaking turns, and the turn transitions in the data according to the following rules adopted in Kauling (2012) and Notarrigo (2017). Working on gestural phenomena in this dissertation, I also draw on other researchers' frameworks who have acknowledged the paramount role of multimodal cues in the management of and transitions between turns-at-talk beyond speech, as tools that are apt to indicate when a new turn begins or ends (see Mondada, 2007, for a thorough overview of the role of multimodal cues in turn taking). Thus, the general rule, following Notarrigo, was to put the first boundary in ELAN indicating the beginning of a turn at the moment the signer/speaker (L1) turned his/her eyes away from the

[17] A warm thank you to Anna Tavier for her meticulous work in the translations of the files in the FRAPé Corpus.
[18] The translation of LSFB files into spoken French has been performed on a tier called "S003-TRADUCTION", that is, the signer code identification, here signer S003. ID-glosses were done for each hand and are labelled as "S003-MD" and "S003-MG", for glosses on the right and left hands, respectively.

addressee, raised his/her hand(s) and/or made use of facial expressions. Similarly, the annotation boundary was put to mark the end of a turn when the addressee (L2) looked away from L1, started raising his/her hand(s) (and/or other non-manuals) to begin his/her own turn, which made L1 either give up the turn or quickly finish his/her current line of thought. This general rule corresponds to the first type (type A) of turn transitions identified by Roy (2000) (see Figs. 9, 10, and 11).

However, turn transitions are not always as smooth as this first type suggests. Sometimes, gaps can be accompanied by silences in conversations, and other times, people can talk (or sign) at the same time as one another, resulting in overlapping talk/signing. That is, the last string of signs or words of L1 occur at the same time as the first sequences of signs or words of the addressee (L2) who, most of the time, will soon take over the floor. In such cases, therefore, the boundaries were indicated according to the following principle. The end of L1's turn is marked at the end of his/her signing/speech, as in type A, and the beginning of L2's turn is also put when (s)he begins her/his own signing/speech, but the overlapping segment is indicated on a separate dependent (child) tier in ELAN (type C below). Type B refers to moments of non-signing or non-speech between the participants. There is a gap between turns, which is sometimes due to silences in the conversation, for example. The three types of turn transitions that have been noted in the data based on Roy's (2000) typology, which itself elaborated upon Sack et al.'s (1974) turn-taking model, are presented below with an accompanying screenshot of the annotation tiers illustrating them:

Type A. Regular turn transitions: no gap, no overlap.

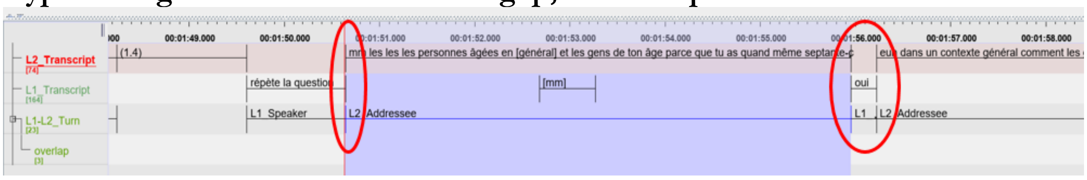


Fig. 9: Regular transition from L1 to L2 in the CorpAGEst Corpus, S3, C001.

According to Sacks et al. (1974), these smooth transitions occurring between speaker/signer and addressee turns are considered to be optimal turn exchanges. This particular type of allocation takes place between two participants, either a pair of speakers or signers, where the spoken or signed utterance of one speaker/signer (L1) is smoothly followed by the next spoken/signed utterance of the addressee (L2). In other words, when one turn ends, the next one begins instantly.

Type B. Turn transitions around silence, pause and lag time: Gap.

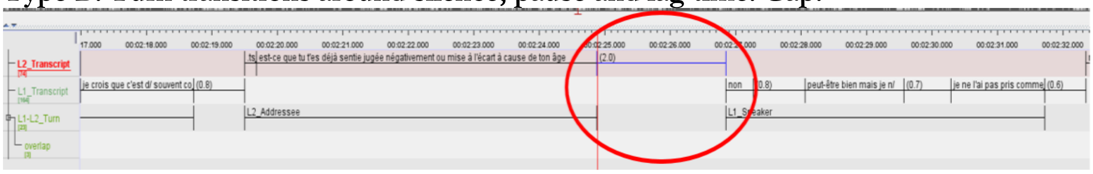


Fig. 10: Turn transition from L1 to L2 showing a pause in the CorpAGEst Corpus, S3, C001.

In this transition type, one or other of the participants resumes their turn after a moment of pause or silence. There is a gap in the annotation tier, as illustrated in the figure above, in which we can note that between L2's turn [L2_Adressee] and L1's next turn [L1_Speaker], there is a gap of two seconds.

Type C. Overlapping turns: Overlap.

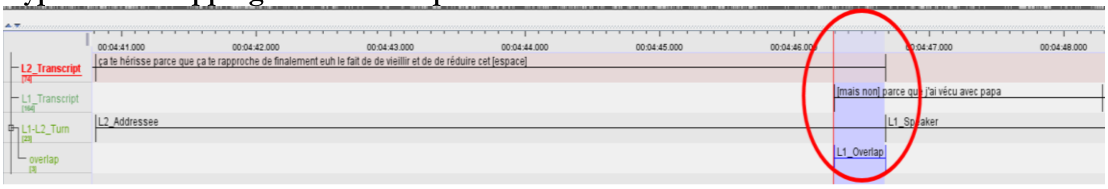


Fig. 11: L1 overlaps with L2's uncompleted turn in the CorpAGEst Corpus, S3, C001.

Overlapping talk[19] or signing occurs when two individuals in conversation talk or sign simultaneously for a given period of time. In the case presented in the figure above, there is overlapping talk because L1 starts her speaking turn before L2 has finished hers. Usually, overlapping talk is resolved when one person ceases to speak. The same holds true for SL conversations (Girard-Groeber, 2015). In this study, type C annotations have been added in a similar way to type A, except that the overlapping sequence has been indicated on a child tier of the parent tier "[L1-L2_Turn]":

Articulator, Level	**Tiers [Name] in ELAN**	**Entry Description**
Turns	Independent Tier: **[L1-L2_Turn]**	[L1_Speaker] [L1_Signer] The participant holding the turn in the interaction is L1.
		[L2_Addressee] The other participant who can interact and respond freely in the interaction is L2.
Overlap	Dependent Tier: **[Overlap]**	[L1_Overlap] when L1 overlaps L2's turn [L2_Overlap] the other way around

Fig. 12: Controlled vocabulary with the description for Turn and Overlapping Tiers in ELAN.

3.3.3 Gaze direction

Gaze direction was annotated only during the types of manual movements constituting the units of analysis (viz., PU, IFE-G, and holds). On the tier associated with the "Gaze" span called "[L1_Gaze_Direction]", information is provided on the "Direction" of the gaze and on the type of contact target. The possible values for the controlled vocabulary (Fig. 13) are adapted from Meurant's (2008) study of gaze in LSFB and from Notarrigo's (2017) and Gabarró-López's (2017) dissertations. In total, eight values were used to describe the gaze direction of signers and speakers. Gaze can be addressed to the main interlocutor (<AD>), or the moderator in LSFB and FRAPé data (<AD:MOD>) who provided participants with the guidelines and asked the questions. That person was still present in the recording room, which had an effect on the participants, who sometimes talked or signed to the "wrong" addressee. Gaze can also be floating, as in lacking expression or without any precise target, (<FL>). This category is further subdivided into <FL:UP> if the participant looks up while looking for words, for instance, and <FL:DOWN> if it is directed downward.

[19] By overlapping talk, I mean only overlaps occurring in speech. Gestural overlaps were not systematically annotated given that this fell beyond the scope of this study. However, speech overlaps often resulted in utterance suspension through gesture, and these cases were further analyzed (see Chap. 5 on holds).

If gaze is not directed at the addressee nor vague but rather fixed on a particular position in space or within a role shift, then it receives the tag <SP>. <SP> was attributed to a gaze which was "directed to a position in space or within a role shift" in LSFB (Gabarró-López, 2017, p. 54). Lastly, the tags <BO> and <CAM> were chosen for when a gaze was directed toward a part of the locutor's or the addressee's body, or when the gaze target was a camera present in the recording room. I also decided to indicate closing eye gaze as <CL> referring to Braffort and Chételat-Pelé's (2011) measure: "if the 'closed eyes' […] are not maintained more than the duration of one frame, this is a blink; otherwise, this is an 'eye closure'" (p. 175)[20].

Articulator, Level	**Tier [Name] in ELAN**	**Controlled Vocabulary [CV]**	**Entry Description**
Gaze Direction	Independent Tier: [L1_Gaze_Direction]	Addressee **<AD>**	Gaze directed at the main addressee
		Moderator **<AD:MOD>**	Gaze is addressed to the moderator providing the guidelines in LSFB and FRAPé
		Floating, vague **<FL>**	Gaze lacking direction and no precise target. It was further divided into <FL: UP> and <FL: DOWN>
		Body **<BO>**	Gazing at one's own or the addressee's body part.
		Camera **<CAM>**	One of the cameras is the gaze target.
		Closing **<CL>**	Eyes are closed for a certain period (more than blinking).
		Role Shift **<SP>**	Gazed addressed to a location in space or within a role shift in LSFB.

Fig. 13: Controlled vocabulary with the description for the Gaze_Direction Tier in ELAN.

The examples below depict the different kinds of [Gaze_Directions] that were given the following tags (from left to right): (picture 1) <FL:DOWN> gaze, two <FL:UP> tags in FRAPé and LSFB (pictures 2 and 3), a floating gaze <FL> performed by C001 (picture 4) during a hesitation followed by a<BO> gaze (picture 5) where C004 looks at her hands. Lastly, S002, during a personal transfer depicting walking, which received the tag <SP> (picture 6).

[20] As the authors argue, such a definition is subject to the frame rate of the videos. In the authors' case, frame duration is 40 ms while in ours, frame duration is 20 ms. Thus, more than two frames (40 ms) were counted to decide between blinking and eye closure.

Fig. 14: Illustration of different gaze directions in BF and LSFB.

A last case is illustrated in more detail in the next sequence below where the signer (S001) experiences some trouble during her utterance production. She is making a mistake while signing about the age at which she left school. When making that mistake, she is closing her eyes "<CL>" for more than a two-frame period. Once she has corrected herself and told the right expression to her addressee, she opens her eyes again and resumes her story:

(1) S001: AGE 16.2 **<CL> 14**
When I was 16, euh no, 14

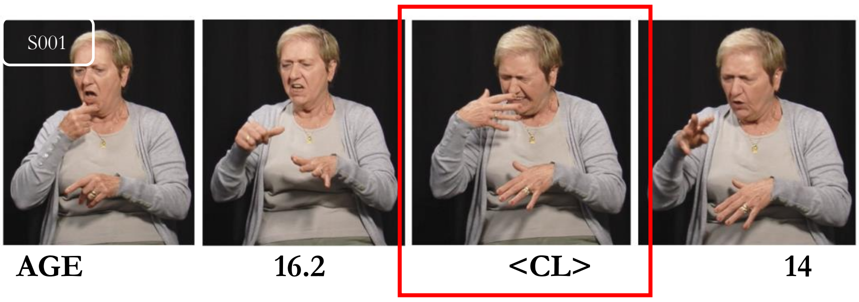


Fig. 15: Illustration of closing eyes in the LSFB Corpus, Task 03, S001 (5:32.556-5:33.976).

3.3.4 Gesture annotation (including holds)

The following tier descriptions have been introduced so far: speech transcriptions, translations, ID-glosses in LSFB, turns, overlaps, and gaze directions. The remaining tiers concern the types of movements, which are the focal point of investigation in this dissertation.

As previously argued, one of the first steps consisted of identifying manual phases that had potential for meaning, viz., strokes. The present approach includes all visible bodily actions (Kendon, 2004) found at the lower limit of gesture (Andrén, 2014) including non-representational gestures like self-adaptors, which have shown potential in interaction (e.g., Duboisdindien et al., 2019). Hence, a move has potential to be meaningful "when it transmits at least (partial) semantic-conceptual (iconic, metaphoric, symbolic) or pragmatic procedural meaning (beats, adaptors, interactive gestures, etc.) given its meaning actualized in context" (Bolly & Boutet, 2018, p. 11). Two sets of tags were used to distinguish between the macro-functional domain, referred to as "Function-D", and the micro-functional category, "Function-C". The former includes the four major domains adapted from Halliday's (1970) three-folded model of language, namely, the ideational, the textual, and the interpersonal levels, while the latter refers to the specific functional categories within the major domains.

Adopting a form-based approach to gesture and sign (Bressem et al., 2013), the present annotation system is rooted in the protocol established within the CorpAGEst project, which in turn is grounded in a linguistic-semiotic approach to language use and is inspired by previous coding schemes (Allwood, 2008; Colletta et al., 2009). Two main steps were carried out following the double distinctiveness principle according to which "a visible action could be considered as a meaningful unit in the ongoing flow of interaction: **(i)** from **the formal perspective** and **(ii)** from **the semantico-pragmatic perspective**" (Bolly, 2016, n.p).

The first layer of annotation, thus, concerns the formal perspective of annotating the following movements: the PALM-UP (PU), the Index Finger-Extended Gesture (IFE-G) and holds. These tokens were first identified in the corpora, focusing on one articulator at a time and by breaking down the movement into a succession of phases, viz., preparation, stroke, hold, and return (Kita et al., 1998). The identification of strokes helped in identifying manual movements (e.g., PUs and IFE-Gs). All the annotations were implemented on tiers in ELAN. On the one hand, the types of manual movements were identified on an independent tier called "parent-tier" where PUS and IFE-Gs were tagged. On the other hand, given the possible and likely overlap between manual moves and holds, a separate dependent tier (also called a "child-tier") for the detection of holds was established for each hand. A hold could occur at the beginning and/or the end of a PU, for example (see Chap. 5 on holds). The following figure brings out in more detail the tier organization in ELAN for the type of manual movements annotated in the present work:

Articulator, Level	**Tier [Name] in ELAN**	**[CV]**	**Entry Description**
Units of analysis[21]: Types of Movements	Independent Tier: [L1_Type_Move_LHand]; [L1_Type_Move_RHand]	PALM-UP **[PU]**	Rotation of the hand(s) upward. Fingers may be more or less curved, or extended. The rotation may be absent if hands are on lap.
		Index Finger-Extended G **[IFE-G]**	Movement of the hand with a distinctive index pointing form.
	Dependent Tier: [L1_LHand-Holds]; [L1_RHand-Holds]	Hold **[HOLD]**	Momentary halt of the hand tensed throughout the hold execution.

Fig. 16: Controlled vocabulary with the [Type of Movement] Tier in ELAN.

[21] For the functional annotation, see the next section on gesture categorization.

While each type of movement is properly defined in its respective chapter (Chap. 3 on PU, Chap. 4 on IFE-G, and Chap. 5 on holds), a few words as regards some of the methodological terms used for their respective annotation are introduced below:

- **Palm-Up [PU].** Different tags for the controlled vocabulary of PU were established to refer to its form, and are the following [in brackets]: [PU] denotes a two-handed Palm-Up performed by a rotation of both hands simultaneously, [PU:R] and [PU:L] refer to one-handed Palm-Ups produced by the right and left hands, respectively. A last tag [PU:A] is associated with two-handed PUs that differ in time, that is, when both hands either start and/or end at different moments (Gabarró-López, 2017, p. 51).
- **Index Finger-Extended Gesture [IFE-G].** The following values were attributed to the IFE-G, distinguishing between left [IFE-G:L] and right [IFE-G:R] one-handed IFE-G, as well as both-handed productions: [IFE-G] and [IFE-G:A].
- **Holds [HOLD].** Based on previous research on holds in LSFB, three different types of holds were distinguished following Notarrigo's (2017) typology. First, holds that occurred at the beginning of a sign or gesture were tagged as <S1:ST> while holds occurring at the end of a sign or gesture were annotated as <S1:EN>. A freezing of the movements at either the initial stage or the end of the handshape and the location of the sign/gesture concerned characterizes these holds. Second, holds occurring in neutral space position, that is, moments when the signer/speaker does not sign or gesture but has his/her hand in front of his/her body, were identified by <S2:NE> for their association with some interactive functions such as planning and suspension. Lastly, <S3:IN> was tagged for index finger-extended handshapes, identified as cases of index pointing without any pronominal nor localization values (Notarrigo, 2017, p. 41). These kinds of holds turned out to be a unique feature of signed discourse within the limits of the samples analyzed in the current research project (see Chap. 5, holds).

3.3.5 Summary

To summarize, the steps of the methodological process regarding the annotation of the units under analysis consisted of two main layers of annotation, namely, a formal annotation and a functional categorization of gesture. First, a form-based annotation process was carried out, as described above, whose aim was to identify the different units of analysis examined in this dissertation, without any interpretation (yet) of their roles in the data. Then, a second layer of annotation was devoted to the attribution of semantico-pragmatic functions. In other words, the three types of manual activity, viz., PU, IFE-G, and holds, were attributed a function in the signed and spoken data. This categorization process constitutes the topic of the next section. It is important to indicate to the reader that the identification of each of these three manual elements is discussed separately in each of the chapters devoted to their specific analysis, in particular, regarding the definition and identification of the PU (see Chap. 3), the IFE-G (see Chap. 4), and holds (see Chap. 5), respectively.

3.3.6 Initial gesture categorization

3.3.6.1 A two-step path

The gesture categorization followed a two-step path: (1) all types of manual activities (except for adaptors and activities) identified in the spoken and signed data were categorized based on previous typologies found in the literature (Bavelas et al., 1992, 1995; Bolly & Crible, 2015); (2) the protocol was tested against actual data to observe whether adjustments had to be made. Following this, slight changes and additions were made to the original categorization in order to meet the goals of the present research topic regarding the analysis of interactive hand practices in signed and spoken interaction.

(1) The current functional categories are rooted in pre-existing functional typologies. More specifically, the units of analysis were first categorized using Crible's (2014) typology. In turn, Crible's (2014) work served as a basis for Bolly and Crible's (2015) multimodal functional model that "allows a detailed description of the functions of pragmatic markers from a multimodal perspective" (Duboisdindien et al., 2019, p. 1), merging previous gestural typologies (Bavelas et al., 1992, 1995; Colletta et al., 2009). Bolly and Crible's final annotation protocol model is also inspired by Halliday's (1970) categorization of language, which comprises three main domains of language, namely, the ideational (content-oriented), structuring (text-oriented), and interpersonal level (encompassing the expressive: speaker-oriented, and the interactive function: addressee-oriented). Briefly, these domains correspond to four macro-functions of language, general ones, which can be further decomposed into specific functions. The resulting scheme corresponds to 41 "micro-" functions, referred to as functional categories, which belong to the four major domains of language mentioned above.

(2) Then, the developed typology was first tested against data. Following that, the protocol was assessed with an Inter-Rater Agreement (IRA) test (Cohen, 1960) in order to verify its validity. This experiment was conducted as part of my research stay at the University of Quebec in Montreal (UQAM), Canada. The results of this experiment, along with the resulting modifications, are presented in section 3.4, this chapter. All in all, the final version of the functional typology used to attribute functions to the current markers of analysis was the one made after all the modifications following the IRA Test conducted on the PU.

3.3.6.2 Functions of language (Halliday, 1970).

Four main function domains, namely, interactive, expressive, structuring, and ideational, were used. Each main category can be divided into a series of various specific functional subcategories. For example, the interactive category can be decomposed into the following functions: opening, suspending, or closing a turn; showing agreement; monitoring the addressee; and marking common ground. These specific functional categories were mainly formulated based on Bavelas et al.'s (1992, 1995) work on interactive gestures. In other words, each manual movement was attributed to a main domain of functions (viz., macro-functions) such as interactive, and a specific function (viz., micro-functions) which is dependent on the domain tier.

❖ **The Domain Tier [Funct-D]** is dependent on the type of movement for each hand. It is made up of the following controlled vocabulary entries:

Articulator, Level	**Tier [Name] in ELAN**	**[CV]**	**Entry Description**
Domain Function	Dependent Tier: [L1_LHand-Funct-D]; [L1_LHand-Funct-D]	Ideational **[IDE]**	Signals a relation with real-world events, including deixis, representational, cause, consequence, temporality, contrast, concession, condition, exception, and alternative.
		Structuring **[STR]**	Cohesive and structuring organization of discourse, including punctuating, addition, enumeration, resuming, and topic shifting.
		Expressive **[EXPR]**	Frames how an utterance should be interpreted as regards the speaker/signer's degree of certainty, possibility, or hypotheticality, including attitude (stance), comment, emotion, opposition, reformulation, and specification.
		Interactive **[INT]**	Manages speaker/signer-addressee relationship and the talk itself, including planning, common ground, delivery, monitoring, (dis-) agreeing, and opening, suspending, giving, and closing a turn.

Fig. 17: Controlled vocabulary with the description for the Domain [Funct-D] Tier in ELAN.

❖ **The Function Tier [Funct-C]**, child tier of [Funct-D], "specifies the discourse relation or otherwise pragmatic function of the marker" (Crible, 2014, p. 8). The list of the functional categories is provided below for all macro functions, and a more comprehensive definition of all functional categories for the interactive macro-function is offered in Table 4.

[IDE] **Ideational**	**[STR]** **Structuring**	**[EXPR]** **Expressive**	**[INT]** **Interactive**
Abstract Deixis **[AD]**	Addition **[ADD]**	Attitude **[ATT]**	Agreeing **[AGR]**
Alternative **[ALT]**	List **[LIST]**	Approximation **[APPR]**	Common Ground **[COGR]**
Cause **[CAU]**	Punctuating **[PUNCT]**	Conclusion **[CCL]**	Delivery **[DELIV]**
Concession **[CONC]**	Quoting **[QUO]**	Emotion **[EMO]**	Digression **[DIGR]**
Condition **[COND]**	Resuming **[RES]**	Emphasis **[EMP]**	Disagreeing **[DISAGR]**
Consequence **[CONS]**	Textual Deixis **[TD]**	Motivation **[MOTIV]**	Face-Saving **[FACE]**
Contrast **[CONT]**	Topic shifting **[TS]**	Opposition **[OPP]**	Elliptical **[ELL]**
Deixis **[DEIX]**		Relevance **[REL]**	Monitoring **[MONI]**
Exception **[EXC]**		Reformulation **[REFOR]**	Planning **[PLAN]**
Representational **[REPR]**		Specification **[SPE]**	Turn Suspension **[SUSP]**
Temporal **[TEMP]**			Turn Opening **[TURN-OPEN]**
			Turn Giving **[TURN-GIVE]**
			Turn Closing **[TURN-CLOSE]**

Fig. 18: Controlled vocabulary with the description for the Function [Funct-C] Tier in ELAN.

Table 4: Zooming into the definition of all the interactive functional categories (Bolly & Crible, 2015).

	Interactive Function [Funct-C]	Definition	Paraphrases	Extra References
INTERPERSONAL DOMAIN OF LANGUAGE **> Interaction**	Agreeing **[AGR]** (incl. Feedback)	It expresses understanding in terms of an agreeing response or indicates approval of what has previously been said. It excludes positive responses that are content-based like "yes" and semantically linked to an open question.	"I agree", "indeed", "okay", "I understand"	Ferrara (under rev.)
	Common Ground **[COGR]**	It expresses the participant's understanding that the information being conveyed is shared by the addressee. It includes Bavelas' "shared information" gestures, which mark information that the addressee probably already knows. It also includes "general citing" gestures revealing that the point the speaker is now making had been contributed by the addressee.	"as you know" or "as you said earlier"	Holler and Bavelas (2017)
	Delivery **[DELIV]**	It consists of the presentation of a topic as new or salient to the addressee. For instance, the palm-up delivery with the giving/offering function.	"Here's my point"	Kendon (2004), Müller (2004)
	Digression **[DIG]**	It marks information that should be treated by the addressee as an aside from the main point, as part of a parenthesis.	"by the way", "back to the main point"	Bavelas et al. (1992,1995)
	Disagreeing **[DIASGR]**	It expresses a disagreeing response. This function will not be coded when it is expressed by a response signal like "no".	"I disagree", "no"	
	Elliptical **[ELL]**	It marks information that the addressee should imagine for himself/herself; the speaker will not provide further details.	"And things like that", "or whatever"	Bavelas et al. (1992, 1995)
	Monitoring **[MONI]**	It expresses cooperation or checks the addressee's reaction for understanding and attention by an explicit address to the interlocutor. It includes Bavelas': (1) "acknowledgement" of the addressee's response (viz., the speaker saw or heard that the addressee understood what had been said; (2) "seeking agreement"	"I see that you understood me", "do you agree?", "you know?", "eh?"	Bavelas et al. (1992, 1995)

		asks whether the addressee agrees/disagrees with the point made; and (3) "seeking following" asks whether the addressee understands what is said.		
	Planning **[PLAN]**	It indicates that the participant is making a cognitive effort in editing a term or in the processing of speech (e.g., hesitation, word searching, and pause fillers). Planning can be interactively designed as the participant can request help from the addressee during word search activities	"euh"	Goodwin and Goodwin (1986)
	Turn Opening **[TURN-OPEN]**	The item opens a new turn, in which case it indicates floor-taking, or a new sequence within the same topic, namely an introduction to an enumeration or a narrative sequence.		Bavelas (1992, 1995)
	Turn Giving **[TURN-GIVE]**	Turn yielding includes Bavelas' "giving turn" and "leaving turn open". It is used to hand over the turn.	"your turn"	Bavelas (1992, 1995)
	Turn Holding **[TURN-HOLD]**	The current participant produces a given gesture/sign, then holds it without relinquishing the floor while the other participant responds. This function has a strong projection.		Groeber and Pochon-Berger (2014)
	Turn Closing **[TURN-CLOSE]**	It indicates the intention to close a list, a thematic unit, or a turn. It must be in final or autonomous position.	"This topic is now closed"	Bavelas (1992, 1995)
	Suspension **[SUSP]**	It indicates a suspension of the main participant's turn because the addressee interrupts the main frame of speakership. L1 then stops, suspending his/her turn.	Hold gesture	Cibulka (2015, 2016)

3.3.6.3 Final remark

A final remark consists of clarifying a choice made regarding the articulators taken into account and the ones set aside. While I acknowledge the pivotal roles of non-manual markers (e.g., head and torso moves, shoulder shrugs, eyebrow movements, mouth actions, cheek movements, and the like) in both SLs and the bodily conducts in SpLs, they were not systematically annotated in ELAN. However, they were taken into account when assigning a function to a particular gestural marker due to some scholars (McKee & Wallingford, 2011; van Loon, 2012) arguing that some functions of PU are accompanied by specific non-manual markers. In my interpretation of the data (categorization of gestures), non-manuals were considered at the same level as the role of the linguistic context. As mentioned, it is possible for a gesture to carry more than one specific function. In such cases, both functions were given to the gestural element. This phenomenon has been reported in previous works where, for instance, PU can express a modal function while at the same time expressing an interactive function (e.g., NZSL; McKee & Wallingford, 2011; LSFB and LSC; Gabarró-López, 2017; NGT; van Loon, 2012). Finally, tiers for comments were also created for the following two articulators: hands and gaze.

3.4 Revising the initial protocol for gesture categorization

This section discusses the challenging character of the annotation process and the resulting difficulties I encountered during the methodological application of the protocols to actual data. The following lines describe the experiment that was conducted as part of my three-month research stay (from September to December 2018) at the University of Quebec in Montreal (UQAM, Canada) where I joined the research group working on LSQ and Deaf Bilingualism in the Linguistic department, under the supervision of Pr. Anne-Marie Parisot.

As mentioned earlier in this chapter (section 3.3.6.1), the present approach adopts a twofold perspective on the annotation of the data: (1) identifying gestures (viz., form-based approach); and (2) identifying their functions in the communicative context of production (viz., function-based approach). Whereas identifying manual movements is based on a set of predefined recognizable formal criteria, attributing functional roles is slightly more challenging as it touches upon the coder's own perception, and consequently, is prone to subjectivity.

Therefore, two major issues I encountered within my project were to make explicit and address this difficulty experienced with the annotations, especially regarding the attribution of functional categories. The work carried out at UQAM mainly addressed this methodological issue to attempt to assess the subjectivity rate involved in the annotation process by conducting an Inter-Rater Agreement (IRA) test (Holle & Reine, 2014) on LSFB and LSQ data. In what follows, the IRA experiment carried out is described, along with the results obtained, and finally, some tentative conclusions and implications for the future analyses are provided.

3.4.1 Inter-Rater Agreement (IRA) test

One of the issues when manipulating multimodal data is that the annotation procedure is subject to the coder's interpretation. As a result, one of the methodological concerns is to address this level of subjectivity by testing and measuring the reliability of the annotations between coders/annotators. Dealing with this methodological component has implications for the validity of the analyses and forthcoming results, and contributes to the solidity of the methodological procedure used in the dissertation.

In the field of gesture research, but also SL analysis, determining IRA is achieved when at least two (or more) coders independently annotate segments of video data of a gesturing and/or signing person. Reliability in these contexts is observed when annotators obtain "identical" outcomes (at best) for the object of study. In the following point, the IRA test carried out on SL data (LSFB/LSQ) is presented.

3.4.2 Experiment design

The project implemented at UQAM focused on the comparison of two SL datasets for which the IRA was calculated in order to test the annotation protocol for the identification of functional categories. More specifically, an eight-min. sample of LSFB data (drawn from the LSFB Corpus) displaying two male signers (S003 and S004, 83 and 74 years old, respectively) telling each other childhood memories was used. The LSQ sample was part of the QADA Project, *Québec Ami Des Ainés* (2013-2016), and consisted of a 17-min. conversation displaying a female signer (ID code: F1, 78 years old) telling her past life stories to a deaf moderator acting as her main interlocutor. The same protocol for the annotation of semantico-pragmatic functions used in the current framework (Bolly & Crible, 2015) was applied to both LSFB and LSQ data samples by both annotators (R1, for rater 1, and R2, for rater 2), independently. The focus was on the analyses of one of the units examined in this dissertation, viz., the PU in LSFB and LSQ.

Because the segmentation into units of analysis is part of the decision-making process for calculating kappa (see next section), it is important to mention that the test was carried out only on the identification of PU functions (at the macro- and micro-levels of language: Funct-D and Funct-C, see section 3.3.6.2, this chapter) and not on the formal identification of PUs. In other words, the ELAN file already contained the PU annotations identified by R1 so that only the attributions of its functional values had to be annotated (and compared by both coders). Kappa indices for categorization only (separated from segmentation) were ultimately reported for LSFB and LSQ. The same steps were undertaken for both samples by two coders (myself and a master's student from the linguistic department at UQAM[22]) so that the results could be compared for each language and between the two languages.

The opportunity of having access to data in another SL along with the expertise of other researchers and PhD students at UQAM added value to the current research project. More particularly, it offered the possibility to apply the same protocol to a new SL by another annotator whose expertise in this different SL shed light on some of the current issues.

[22] I warmly thank Laurence Gagnon for agreeing to take part in this experiment but most of all for the invaluable help and comments she gave me.

3.4.3 Cohen's (1960) kappa

To measure IRA, I used the EasyDIAg software (Holle & Reine, 2014) independently of its implementation in ELAN. The EasyDIAg tool enables researchers to calculate consensus rates for video annotations performed by two coders independently and, consequently, the suitability of the annotation protocol used in this dissertation. The software routine does not only take into account the temporal overlap existing between annotations (i.e., segmentation) but also the type of units coded (i.e., categorization). In the present case, only rates regarding categorization (viz., classification labels) were taken into account as PUs were already identified in the files where temporal overlaps matched.

In the literature, many studies have a tendency to report only Raw Agreement (RA) indices, that is, the actual agreement as observed in the analyzed samples. However, this RA fails to take into account the agreement rate that would occur by chance alone. By contrast, Cohen's (1960) kappa (K) and its variants are more appropriate to assess IRA in the case of categorical (i.e., nominal) variables as they provide the observed level of agreement between n coders (here, two) for k categories (viz., the functional categories) on N units (in the present case, PUs), by taking into account what would be expected by chance alone. This kind of data has been called "event sequential data" (Bakeman & Quera, 2011). It is thus better to report chance-corrected measures of agreement like kappa instead of RA indices. This is one of the reasons why Cohen's kappa was chosen. Results were then tabulated for the calculation of the kappa statistic.

A key aspect that plays a role in the kappa rate, and that can contribute to lower concordance between coders, occurs when the k categories are not as mutually exclusive and exhaustive as they should be. In other words, to conduct the IRA test, (1) categories cannot overlap at the conceptual level with each other, and (2) all of them taken together need to describe all the range of observed behavior (Cohen, 1960). This is one of the reasons discussed later that certainly did contribute to the higher rates of disagreements obtained in the present experiment.

In addition to providing separate indices for segmentation, categorization, and overall agreement (jointly considering segmentation and categorization), the algorithm gives specific agreement values for specific categories. Additional functions display in more detail which categories are the biggest source of (dis-)agreement between coders, which is very useful for understanding what needs to be improved in the protocol (see section 3.4.5 below).

The K coefficient values range from -1 to 1. The closer the coefficient to 1, the better the agreement between the two coders. Table 5 displays the interpretation grid for kappa values (Landis & Koch, 1977, p. 165).

K	Interpretation
≤0	No agreement
0.1-0.20	Slight agreement
0.21-0.40	Poor agreement
0.41-0.60	Moderate agreement
0.61-0.80	Substantial agreement
0.81-1.0	Almost perfect agreement

Table 5: Interpretation grid of kappa values (Landis & Koch, 1977, p. 165).

There are debates and arguments regarding the interpretation of kappa values in the literature. However, the aim of the present experiment was to find a way to assess the methodological protocol to strengthen that protocol for the forthcoming analyses. Therefore, Cohen's kappa was used as it appeared to be one of the most common methods used in the scientific community to evaluate this methodological aspect of annotation. The next parts describe the results, based on Table 5, obtained: (1) for the IRA for the LSFB sample, and (2) for the LSQ sample made by the two raters (R1 and R2). Finally, tentative explanations for the low agreement rates obtained are discussed in section 3.4.4.5.

Fig. 19 below shows the global results obtained for the K and RA values of the functional annotations of PUs in LSFB and LSQ samples, conducted by R1 and R2. More particularly, the graph illustrates the coefficients obtained for each signer, namely, S003 and S004 from the LSFB Corpus, and F1 from the LSQ data of the QADA project. The PU functional values were calculated for each of the signers' hands, left and right, as well as the macro-functions (viz., referring to the four major domains of language, namely ideational, structuring, expressive, and interactive) and the micro-functions (viz., the functional categories).

The values in light blue correspond to the kappa coefficients while the dark blue values reflect the RA rates. One observation can already be made: RA values are higher as they reflect the actual percentage agreement rates, non-corrected, obtained in the samples, which fail to take into account chance.

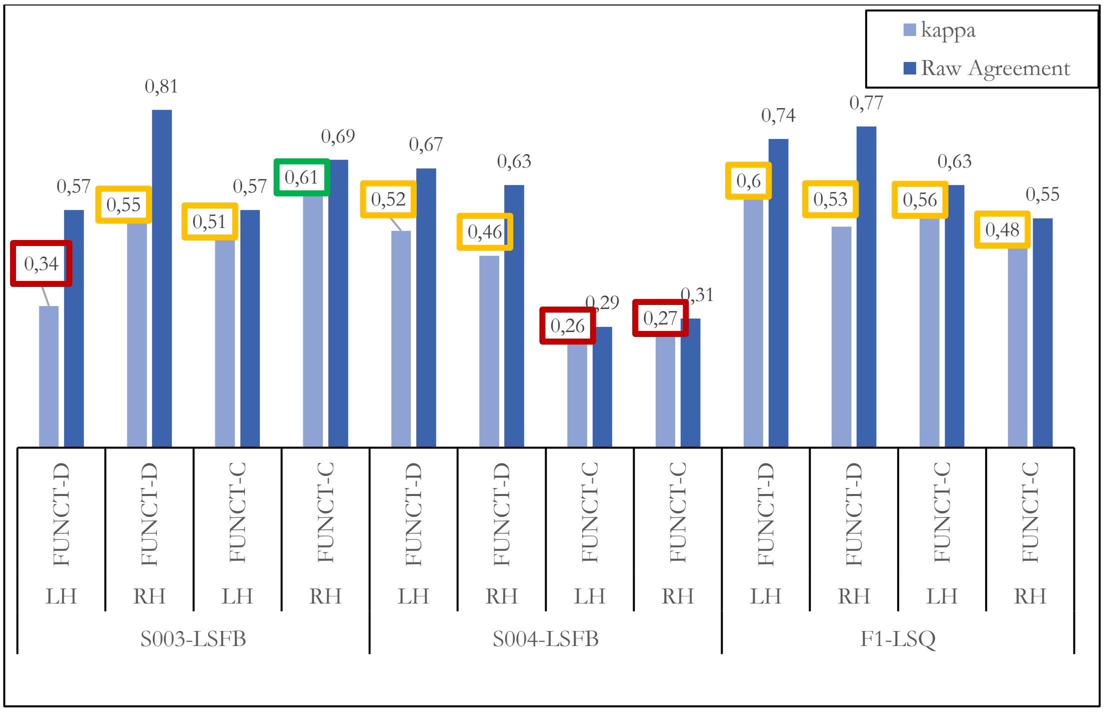


Fig. 19. Overall results for kappa and RA in LSFB (S003-S004) and LSQ (F1).

Based on the interpretation grid presented in Table 5 and the results displayed in Fig. 19, it is noticeable that K varies according to the following aspects: the signer, the handedness (viz., whether the PU is articulated with the left or right hand), the macro-functions of language, and the functional categories (micro-functions).

In addition to providing the global K coefficients, the algorithm also gives a global agreement matrix that allows the researcher to examine in more detail the agreement/disagreement rates observed between annotation types. In other words, this matrix enables us to see what types of annotations have led to (dis-)agreements. In the present experiment, this is very valuable as it allows the exact categories that have been a source of difficulty for the annotators to be pinpointed and, therefore, sheds light on what needs to be improved for the annotation protocol.

Next, closer attention is paid to the global agreement matrix. A general discussion of the results in LSFB and LSQ is introduced, followed by the coefficient interpretations of LSFB and LSQ data, which reveals the categories that led to a higher rate of disagreement *vs.* those that portray a higher rate of agreement between R1 and R2. Being able to locate the disagreements stemming from confusion on certain types of categories will help to strengthen diagnostic criteria within the methodological annotation protocol.

3.4.4 General discussion of the results

3.4.4.1 Cohen's kappa in LSFB

Cohen's kappa obtained for the macro-functions of language (Funct-D) for signer S003 was 0.34 for the left hand (LH) and 0.55 for the right hand (RH), indicating that there was a poor to moderate consensus among raters (Landis & Koch, 1977). This is mainly due to the higher rate of agreement for specific functions such as the one marking agreement (AGR) from the interactive domain of language, especially for the RH, as this kind of function is usually produced by one-handed PU forms. In general, functions belonging to the interactive domain demonstrate a higher rate of concordance between raters' annotations than functions belonging to the expressive domain of language, for instance, which represents the biggest source of disagreement. By contrast, looking at the functional categories (Funct-C) for both hands of S003, there is a rate of 0.51 for the LH and 0.61 for the RH, which ranges from moderate to substantial agreement.

As far as signer S004 is concerned, a moderate rate of 0.52 and 0.46 for the macro-functions is observed for the LH and RH, respectively, which is not so unsatisfactory. However, rates for the functional categories of both hands have a weak K of 0.26 and 0.27.

3.4.4.2 Cohen's kappa in LSQ

The results for the LSQ sample show slightly higher rates for signer F1's K coefficients in comparison to both LSFB signers. This is due again to a better agreement rate for specific functions, which already had a good agreement rate in the LSFB sample. All in all, F1's results suggest that regardless of the signer's hands or the macro-functions and the functional categories, the kappa coefficients vary from 0.48 to 0.60, that is, according to the interpretation grid, a moderate agreement. There is, however, a slight difference between the functional categories, which are slightly lower (0.56 for LH and 0.48 for RH) than the macro-functions (0.60 for LH and 0.53 for RH). This is a normal observation given that the range of possibilities of functional categories to choose from is wider than the possibilities of the macro-functions of language (total: 41 functional categories *vs.* only four domain functions of language).

The next section analyses the coefficients in greater depth. The aim is to address the following question: what are the categories that have led to a greater level of confusion *vs.* those that have contributed to a better agreement rate between R1 and R2? The section first discusses the results for the LSFB sample and then the results for the LSQ sample.

3.4.4.3 LSFB: Global Agreement Matrix for S003 and S004

Fig. 23 below represents the global agreement matrix for the annotations of the macro-functions of LSFB signer S003. Each figure displays the number of annotations on which the annotators agreed or disagreed when attributing the functions, for the LH and RH, respectively. The top (horizontal) units correspond to rater 1 (R1) and the vertical units belong to rater 2 (R2). The main diagonal in green highlights the number of categories on which the two raters agreed when annotating PU's macro-functions, while disagreeing annotations (represented in red circles) are identified in the boxes surrounding the diagonal line:

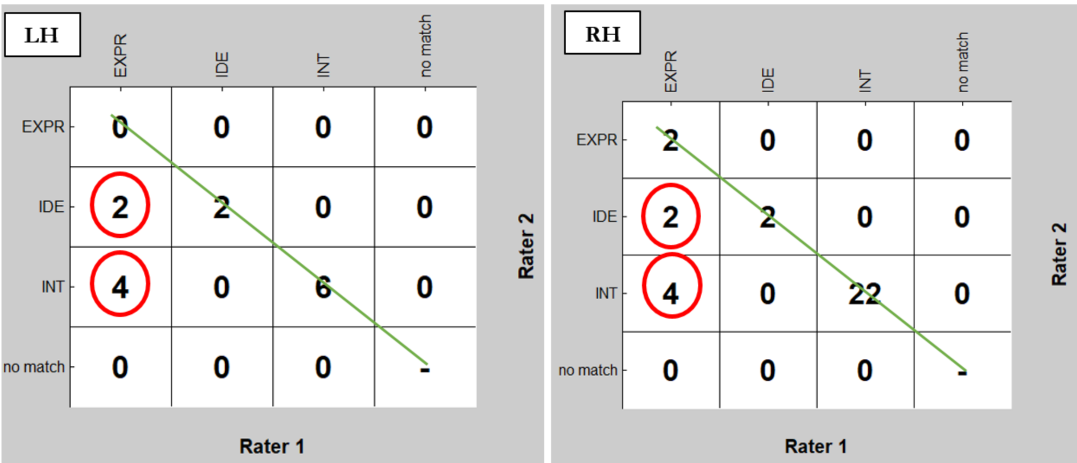


Fig. 20: Global Agreement Matrix for S003 – Macro-functions of language.

There are three major domains that were identified on S003's discourse for the PU, namely, the ideational (IDE), the expressive (EXPR), and the interactive (INT) domain (Halliday, 1970). As stated previously, the agreement rate is poor for S003's PU annotations of the LH while moderate for the RH. This can be explained by looking at the figure above; there are a higher number of annotations (n = 11) that both raters identified as belonging to the interactive domain of language (INT), showing the raters' agreement. This matrix reveals the fact that only the expressive domain of language (EXPR) has led to confusion between the annotators. While R1 identified some PUs as belonging to the expressive domain, R2 annotated them as belonging either to the ideational (n = 1) or the interactive (n = 2) domains of language. By contrast, agreeing rates are found within the interactive domain of language, especially for PUs produced with the RH. The figure below represents the global agreement matrix for signer S003 for the functional categories (the micro-functions) of PU, which allows us to identify the functional categories within the four domains of language that caused a problem during the annotations.

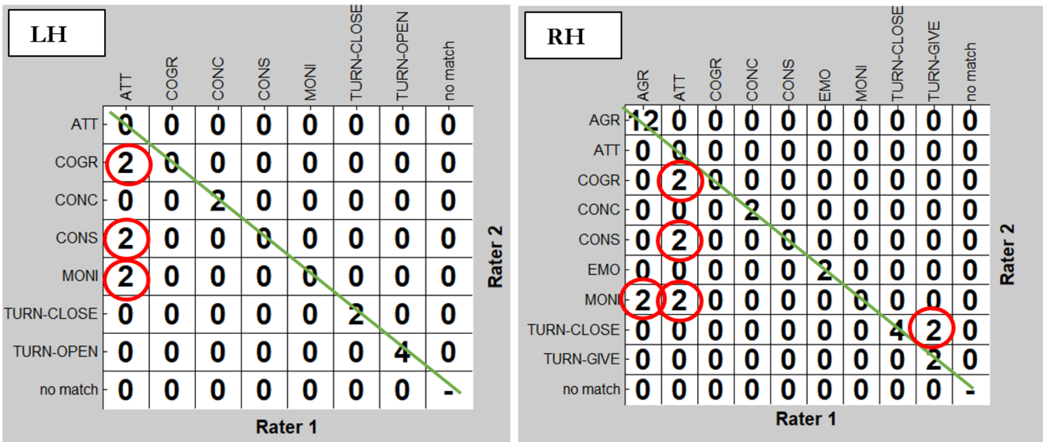


Fig. 21: Global Agreement Matrix for S003 – Functional Categories.

One the one hand, concordance between raters is found in anything related to the turn-taking system (turn opening and especially closing) and the interactive functions of marking agreement, which express understanding or indicate approval of what has previously been said (incl. backchannel expressions). On the other hand, the category known as "attitude" (ATT), which is defined as the expression of the speaker's subjective attitude, including evidentials, epistemic/cognitive stance, or positioning, displays the greater rate of disagreement. It is related to the gesturer's degree of knowledge of, and commitment to, a state of affairs, as well as the origin of this knowledge (Bolly & Crible, 2015). This category represents the biggest source of difficulties, especially with other interactive functions such as monitoring (MONI) and common ground (COGR).

Thus, where are the (dis-)agreements found for S004? S004 displayed slightly better kappa indices for the macro-functions (0.52 and 0.46, for the LH and RH, respectively) than S003.

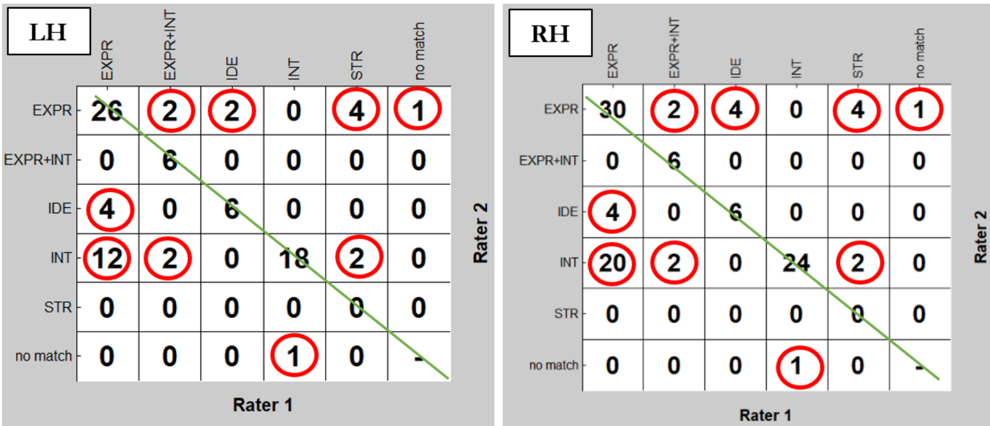


Fig. 22: Global Agreement Matrix for S004 – Macro-Functions of Language.

As illustrated in Fig. 22, only the expressive (EXPR) domain of language led to significant problems between R1 and R2. For instance, when R1 annotated a PU as EXPR, R2 identified it either as belonging to the ideational (IDE) or the interactive (INT) domain of language for the LH. This holds true for the RH as well. There is just one PU that was identified as structuring by R1 and noted as interactive by R2. However, values for the functional categories are poor (0.26 and 0.27). Poor agreement between annotators concern attitude, uncertainty, and planning, as well as the double functions linked to attitude.

3.4.4.4 LSQ: Global Agreement Matrix for F1

Now, in the LSQ signer's matrix, are they the same functional categories that were confusing for the annotators in the LSFB sample? In a way, yes; the same functional categories at the macro and micro levels are the most affected by the rates of disagreement observed between coders, which concern confusion between expressive and interactive levels, as displayed in Fig. 23:

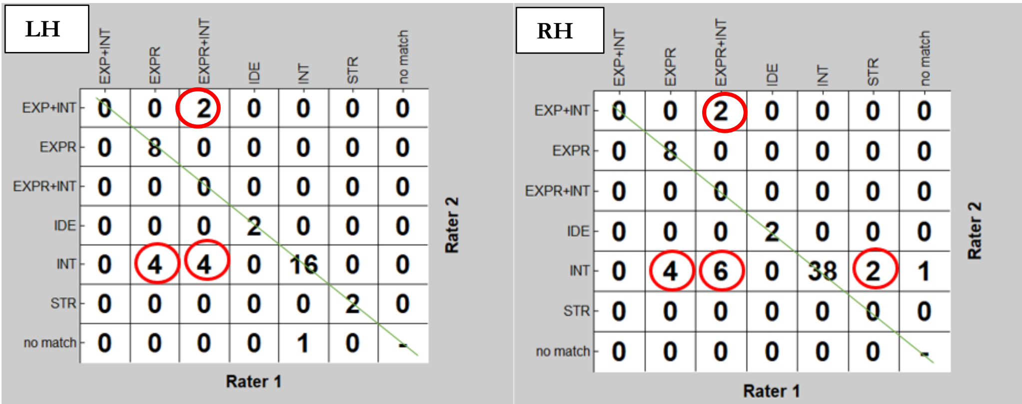


Fig. 23: Global Agreement Matrix for F1 – Macro-Functions of Language.

However, upon close observation of the functional categories that are concerned with the inter-annotator disagreement rates, they are different from the ones found in the LSFB sample, independently of the hand (left or right). The functional categories that were most confusing are those expressing: common ground (COGR), that is, PUs that express shared knowledge between participants and their addressees; monitoring (MONI), which refers to the action of checking the addressee's attention and understanding; and planning (PLAN), which displays a moment of lexical search for a word or hesitation from the speaker/signer. To a lesser extent, the punctuating and uncertainty categories were also unclear to coders. By contrast, agreements between R1 and R2 were again found on the interactive functions of agreeing (AGR) and those related to turn taking (TURN-CLOSE and TURN-OPEN).

3.4.4.5 Some conclusions

A few tentative explanations and factors can account for the relatively low agreement rates between the two annotators. These reasons need to be discussed and not relegated to the background of the research process. They are outlined below.

First, there might have been some discrepancy between the two coders as regards the familiarity with the protocol used for the annotations. The second coder from UQAM had never used this protocol prior to the present test. Despite the sessions that were organized to explain the protocol to R2, it might have taken her some time to adapt and grasp the different functions and their nuances, along with the functioning of the protocol as a whole.

Second, a question arose while annotating SL data prior to the research stay as to whether there was a need for coders to possess full linguistic knowledge of the SL examined. For instance, as the main annotator of the data in both LSFB and spoken

BF, I was faced with the challenging task of annotating all my data in LSFB for which I did not have the full linguistic skills and knowledge. I believed that if there were low agreement rates observed between myself (a beginner learner of LSFB) and a bilingual (LSFB-BF) individual, this would be because of the difference between the two linguistic commands of the target SL. Thus, carrying out the IRA test as part of the scientific exchange at UQAM with another peer who had no prior knowledge of LSFB, and myself, with no knowledge of LSQ, enabled us to situate more accurately where the annotation difficulties lay.

From the analyses conducted on both SLs (LSFB and LSQ), the results point toward the idea that the differences in IRA rates are not due to linguistic knowledge in the target SL. Instead, it appears that the difficulties experienced by both coders depended on the actual context of production of the gesture and its related functions. In other words, the trouble raters have in rating a gesture depends on the actual function it serves in the communicative context, i.e., some functional categories seem harder to identify than others. A case in point is the category of showing agreement, which was the interactive category with the highest rate of agreement between coders in all samples, independently of the SL. The reason is that the kind of gesture expressing agreement (or feedback) is easily identifiable for the coders. Indeed, agreeing functions usually accompany a gestural movement in the direction of the addressee, which is easier to identify than something related to the inner attitude of the speaker/signer as explained in the continuity of this section. By contrast, other functional categories such as expressions of subjective attitude, uncertainty, or even planning, were less easy to pinpoint and displayed a greater rate of disagreement.

Another factor already mentioned that definitely contributed to the low agreement rates is that some categories were not as mutually exclusive and exhaustive as others. Yet, one of the criteria for kappa calculation is that k categories must be mutually exclusive and exhaustive. When verifying the functions that led to the greater disagreement rates, the observation was that some functional categories overlapped conceptually (viz., were not mutually exclusive). This highlighted the need for describing the annotation protocol in more detail. Thus, in order to counter this effect, the targeted functions were more thoroughly described. In one case in particular, some categories were merged into one new category marking modality under the label (ATT) for "Attitude" (see section 3.4.5 below)

Moreover, the results showed a higher disagreement rate for PU gestures from the expressive domain of language (EXPR), viz., items that are speaker/signer-oriented, and that convey their subjective attitude, emotions, and stance rather than the ideational, structuring, and interactive domains of language, respectively; (IDE), viz., content-oriented; (STR), viz., text-oriented; and (INT), viz., addressee-oriented. This suggests that it is more strenuous to interpret what is related to the locutor himself/herself than to interpret and attribute meaning to what is linked to the addressee and conversational management activities, along with the text itself, the structure of discourse, and referents in the world.

Finally, what contributed to disagreement might simply stem from the coder's own perception, that is, the way each person as an individual makes sense of phenomena in the world around them. As Bonnardel (1996) pointed out: "*Si nos jugements reflètent notre pensée, ils sont plus rarement en accord avec ceux d'autrui*"[23] (n.p.) In that line of thought, there will simply always be some degree of subjectivity to be reckoned with when working

[23] "If our judgments reflect how we think, they are hardly ever in agreement with others" [my own translation]

with multimodal data in human communication. The researcher's task is to address the issue and discuss some of the tentative factors contributing to such disagreements, while at the same time accepting the fact that identical interpretations of gesture meaning cannot be fully achieved. Nevertheless, these disagreements should not fail to be discussed. Keeping that in mind, I hope I have made an attempt at achieving just that.

3.4.4.6 Implications

To summarize, one of the key concerns of my PhD project was to establish a solid and reliable annotation protocol for the functional section of the analyses. Thanks to the research stay in Canada and the test conducted, it was possible to assess, to some extent, the reliability of the annotation protocol. Although the kappa results reflected mixed outcomes for the IRA tests, they did have a positive impact on the current research project. With these experiments carried out in LSFB and LSQ, it was possible to get more clarity on the functional categories that showed a greater source of disagreement. Some major adjustments were made as a result and they are presented below.

3.4.5 Revision of the annotation protocol for problematic cases

The protocol used as a basis for the annotations was Bolly and Crible's (2015) multimodal taxonomy for pragmatic markers, further completed with Bavelas and colleagues' (1992, 1995) taxonomy of interactive gestures to specify the functions at the interpersonal level of language (Halliday, 1970) (see Figs. 17 and 18). That protocol was chosen because it was made up of detailed descriptions of the various functional categories, including paraphrases and thorough examples drawn from corpus data, which from time to time allowed a clearer choice between two options. In addition, it can be used on larger samples of data, signed, and spoken, which enables researchers to conduct contrastive linguistic and multimodal analyses. It has already been used and tested on several SpLs: English, French, and Slovenian (Dobrovolic, 2016); on multimodal sets of data at the gesture-speech interface in BF (Duboisdindien et al., 2015); and on SLs: LSFB and LSC (Gabarró-López, 2017).

Yet, despite the different languages tested with this protocol, the kappa results obtained for the IRA tests on LSFB and LSQ were very poor for some of the functions, leading me to revisit and redefine some of the categories of the original protocol that were at the origin of this confusion. As mentioned previously, one of the reasons for the confusion between coders – apart from the coder's own perception and interpretation of the data – concerned the categories themselves, which were not mutually exclusive and thus overlapped conceptually.

To counter this conceptual overlap, some of the functions were revised to better suit the purposes of the current research conducted within this dissertation's framework. Revising the definitional categories was carried out after the IRA test. More precisely, the revisions dealt with (1) identifying conceptual overlap among the current functional categories, (2) clarifying some definitions by looking back at the scientific literature, which included a more thorough description of the phenomena under study, disambiguating some functions; and (3) revising some categories that did not cause conceptual issues but were still problematic for coders. These categories were redefined based on more salient and distinctive characteristics that were described in the literature. The following sections illustrate some of the changes.

First of all, the biggest source of disagreement between both coders for all participants, LSFB and LSQ signers, was found within the expressive domain of language (EXPR), that is, all markers revealing the locutor's subjective attitude. Examining the definitions in Bolly and Crible's (2015) initial protocol for the functional categories of attitude (ATT), uncertainty (UNC), and comment (COMM), these three functions belong to the more general modal function of pragmatic markers. They can be gathered under one general function of "modality" which reflects the locutor's subjective attitude (ATT), given that these three categories display the speaker's/signer's attitude toward the utterance content in the discourse. A case in point is reflected in the (ATT) and (UNC) functions. Before, these two functions overlapped conceptually in that they were both linked to the speaker's or signer's degree of knowledge: whether it was his/her degree of knowledge toward an element in the discourse or his/her ignorance of the fact in question. These categories led to a large number of annotation problems between the two coders because they were not mutually exclusive. Combining these functions under (ATT) saves future annotators from having to make the tough decision between the degrees of knowledge given that the difference between the previous (ATT) and (UNC) categories is very subtle in nature. The same applies to the (COMM) category. Previous studies have put that function under the label of "attitude" as it is part of the modal function (e.g., McKee & Wallingford, 2011).

Funct-Tag in ELAN	Previous Function-Definition	Criteria/ Paraphrase	References
[ATT]	**Attitude**: expression of a subjective attitude from the speaker, including evidentials, epistemic/cognitive stance, or positioning. Relating to the gesturer's degree of knowledge of, and commitment to, a state of affairs, as well as the origin of this knowledge.	The PU evidential function + shrug	Kendon (2004)
[UNC]	**Uncertainty**: item that indicates or underlines the ignorance of the speaker about the propositional content conveyed.	"I don't know"	Müller (2004)
[COMM]	**Comment**: Comment that is not directly related to the meaning conveyed by the linguistic content, but is considered relevant for full understanding, often taking the form of a (reduced) parenthetical or incidental clause (without any mitigating function).	"I believe" "By the way"	Bolly (2014)

Funct-Tag in ELAN	New Function-Definition	Criteria/ Paraphrase	Reference
[ATT]	**MODAL** Function + Expressive non-manual combination marking **modality**, **evidentiality**, and **affect**. The gesture acts as a manual correlate of an expressive non-manual component that conveys the locutor's perspective on certainty, possibility, truth, and evidential status of info in the discourse. The gesture can stand alone as a complement to express negation, evaluation (= auto-comments), or modality >> encompasses the comment function.	As above.	Cooperrider et al. (2018), McKee and Wallingford (2011)

Fig. 24: Example of conceptual overlap from the EXPR domain of language revisited.

Other functions, in contrast, lacked clear definitions. This was the case for the monitoring (MONI), agreeing (AGR), and common ground (COGR) functional categories. For these functions, clarifications were made according to the literature. In particular, in relation to the work of Bavelas and colleagues (1992, 1995), which completed the original definitions from Bolly and Crible's (2015) protocol. The different changes are explained below.

For instance, prior to the modifications, the monitoring function was described as "expressing cooperation or checking for understanding/attention, in the form of an explicit address to the interlocutor" (Bolly & Crible, 2015, n.p.). That definition led to confusion between annotators on the functions marking agreement (AGR) and common ground (COGR). Therefore, Bavelas et al.'s (1995) exact definitions were applied to the monitoring function thereby encompassing any movement that checks for the addressee's attention in the following ways: acknowledging the addressee's response ("I see that you understood me"), seeking agreement, as in asking whether the addressee agrees or not with the point being made ("Do you agree?"); and finally, as seeking following, i.e., asking whether the addressee understands what is being said, analogous to "you know/eh?" at the end of a phrase (p. 397).

Finally, a last function with a relatively high rate of disagreement was the punctuating category (PUNCT). The protocol's definition was not very helpful as it defined that category as the "typographical comma" which "signals the intention to hold the floor while planning the upcoming speech, **or for any other reason not mentioned by the other sequential functions. A marker will be coded as punctuating after elimination of all other sequential possibilities**"[24]. Yet, when exploring the literature to find out what might correspond to gestural markers with a punctuating function, a more detailed definition can be found in Knapp et al.'s (2013) treatment of gesture that defines punctuating gestures as follows:

> [They] accent, emphasize, and organize important segments of the discourse. Such a segment may be a single word or a larger utterance unit, such as a summary or a new theme. When these gestures are used to emphasize a particular word or phrase, they often coincide with the primary voice stress. Punctuation gestures can also organize the stream of speech into units. When we speak of a series of things, we may communicate discreteness by rhythmic chopping hand gestures (p. 214).

Looking back at the possible reasons that explain the low IRA rates, one of them dealt with the linguistic knowledge of the target language, here, LSFB and LSQ. In this study, linguistic knowledge had no apparent influence on the results obtained, neither from LSQ for R1 or LSFB for R2. Rather, the linguistic context and the actual roles of the gesture in the signer's discourse (viz., PU) seemed to play a bigger part. This is why revising the annotation protocol was vital to strengthen it and correct those mutually non-exclusive categories that led to a greater rate of disagreement between the coders.

Prior to introducing the analyses that will be conducted in Part III of this dissertation (in section 5), a last important aspect to present is the annotation

[24] Bold typeface is used in this paragraph to draw the attention to the parts of the protocol's definition that were problematic for the annotators.

procedure, including the different steps that guided the annotation process of all the data.

4 Annotation Procedure

The way the data were annotated did not always follow the order of all the tiers that were previously introduced (section 3.3). There were a few back-and-forths during the annotation process in order to test the functional annotation protocol and achieve a more stable version (as presented in section 3.4). Once these aspects were finished, the annotation procedure followed the subsequent, more general, set of rules:

1. First, the initial step consisted of delimiting the different speaking/signing turns, and the possible overlaps taking place between participants, signers, and speakers.
2. Then, I began to annotate the manual tokens, namely, PUs and IFE-Gs in the three corpora. The identification of holds took place *a posteriori*, once the manual movements had been noted down in ELAN.
3. Following that, the different targets of gaze directions co-occurring with each of the above-mentioned manual movements were identified.
4. The next important step consisted of annotating the discourse functions related to both the macro-domains and the specific functional categories. This was initially performed in the BF corpora without the sound signal in order to avoid any speech biases in the interpretation of the manual gesture, and a second time, with the sound signal. Speech transcriptions and translations in the LSFB Corpus and the BF Corpora helped at the stage of the annotation procedure given the importance of the linguistic context in the decision-making process of attributing functions.
5. Ultimately, all occurrences of all the parameters described above were exported from ELAN to an Excel file to carry out quantitative analyses as well as more fine-grained comparisons within and across the languages and modalities.

The forthcoming analyses along with the statistical tests planned within the scope of this research are described next.

5 Forthcoming Analyses and Statistical Tests

The following chapters (3, 4, and 5), devoted to the respective analysis of PUs, IFE-Gs, and holds, will provide both a quantitative and qualitative panorama of the data processed within and across LSFB and BF. The overarching aim is to specifically address how signers and speakers use particular manual elements to regulate and manage the flow of their conversations with the addressee. More precisely, it aims to examine and understand whether and how the use of under-studied mechanisms as interactional practices differs between BF speakers and LSFB signers in Belgium.

In their book, Leech and colleagues (2015) divide research questions into three basic types, namely, descriptive, difference, and associational, which, in turn, lead to three groups of statistical tests, as summarized below:

❖ **Descriptive research questions** aim to provide a description or a summary of the data, such as the information about demographics. This includes providing descriptive statistics (e.g., mean, percentages, and range).

❖ **Difference research questions** highlight a difference among the data. In such cases, the scores are compared on the dependent variable of two or more groups. These kinds of issues are investigated through various inferential difference statistical tests such as ANOVAs and *t*-Tests.

❖ **Associational research questions** tend to address how two or more variables are associated or related to each other to observe, for instance, how the variables co-vary or how one (or more) variable enables the prediction of another. Statistical tests pursuing such a goal include correlations and/or multiple regressions.

The sections of the results are organized as follows. First of all, prior to conducting any inferential statistics on the data, results are introduced with descriptive statistics related to the manual element (either PU, IFE-G, or holds) analyzed in each corpus as regards the following aspects: mean, standard deviation (SD), and frequency distribution.

The raw and relative frequencies for each of the three manual markers of meaning investigated in this dissertation are provided and calculated. To establish the relative frequencies, two types of measures during calculation were used: a measure per minute and a measure per 100 tokens (including the number of signs for LSFB and the number of words and gestural strokes for BF). This will give the reader an overall picture of the results for each unit of analysis presented in their respective chapter.

As part of the descriptive statistics, the following indices are calculated. For each manual gesture, I look at (i) the frequency of occurrence (distribution per language, per corpus/group, and per participant); (ii) the macro-functions (domain); (iii) their micro-functions (functional categories), with an exclusive focus on the interactive dimension; and (iv) any possible combinations between gaze direction and manual moves (including holds). For each of these enquiries, specific research questions guided the analyses; they are outlined in the next paragraph.

Next, I turn to more specific research questions whose aim is to identify similarities and/or differences and associational relations among the results with the corresponding statistical tests. To conduct these quantitative analyses, the statistical software SPSS was used. Additionally, as mentioned, an IRA test was carried out. For this purpose, the open-source EasyDIAg tool was used (Holle & Reine, 2014), which enabled the calculation of Cohen's kappa, providing chance-corrected indices of IRA (this part of the results was presented in section 3.4, Chap. 2).

Despite the following general statistical measures (mean and SD), difference questions are tackled using inferential statistics, in particular, the Student's *t*-Test and One-Way ANOVAs. Therefore, difference questions such as "Do signers' and speakers' PU/IFE-G score statistics differ significantly?", for instance, are answered using the Student's *t*-Test for independent samples. The Student's *t*-Test is a parametric test that determines whether there is a statistically significant difference between means in two groups. Before running the test, there are preliminary conditions[25] that need to be applied. The two groups of comparison in this research are the languages (LSFB and BF) as employed by the participants. When more than two groups are compared, a *t*-test cannot be used. Therefore, when the three groups are compared – speakers from CorpAGEst (Group 1), speakers from FRAPé (Group 2), and signers from LSFB (Group 3) – a one-way analysis of variance, abbreviated One-Way ANOVA, is conducted[26]. One-way ANOVAs allow researchers to answer questions such as "Are there statistically significant differences among the three groups of participants in regard to the average scores of the type of movements they produce?", for instance. The non-parametric equivalent of the *t*-test is Mann Whitney's *U*-Test, and the non-parametric equivalent of one-way ANOVAs is the Kruskal-Wallis test. These tests are implemented in the chapters presenting the analyses and results of PUs, IFE-Gs, and holds in the discourse of LSFB signers and BF speakers.

Finally, I also wanted to highlight any possible relations between variables, when appropriate. Therefore, a correlational test will be used. A correlation is a way to examine the relationship between two quantitative, continuous variables. Pearson's correlation coefficient (r) value ranges from -1 to +1 and indicates the intensity (the strength) of the relationship between the variables. A positive correlation reveals that the two variables increase together, for instance, while a negative correlation shows that when one variable decreases, the other one increases, and the other way around. For instance, there might be a relationship between the number of signs produced and the equivalent proportion of holds occurring on those signs in the discourse of LSFB signers, suggesting that the more the signers' hands are moving, the more holds take place in the signing stream; and vice-versa for BF, the more speakers gesture, the more holds might characterize their gesturing. To answer this, a correlation test will be conducted to examine whether there exists a relationship between the total number of gestures and words produced by speakers and the total number of holds. The question is the following: is there a significant linear relationship between these variables? Importantly, the link established between the two variables does not pretend to have a predictive or causal nature.

A summary of the analyses is presented below, which includes the different elements that are the object of analysis as well as the structure of their result presentation in each chapter (per language, corpus, and participant for each gestural marker).

6 Summary

The forthcoming analyses will primarily focus on:

1. The frequency and distribution of the units of analysis in the data:
    - Per corpus (CorpAGEst-LSFB-FRAPé), per language (SL-SpL), and per participant (four signers and eight speakers).
        - ❖ Corresponding RQ guiding the analysis: how frequently do signers perform the different kinds of selected gestures (PUs, IFE-Gs,

[25] Preliminary conditions were tested so that these tests could be conducted (if not, then non-parametric tests would have needed to be conducted instead). When conducting *t*-tests, we need to ensure of the normality of distribution, of variances, and the independence of observations.

[26] Preliminary conditions for One-Way ANOVAs are: normality of distribution, homogeneity of variances, and independence of observations.

holds) compared to speakers? Are there any statistically significant differences between the language (LSFB *vs.* BF) and the number of PUs, holds, and IFE-Gs produced, for instance? In other words, do signers and speakers significantly differ on their PU (and the other markers) statistical scores? Are there statistically significant differences among the three linguistic groups regarding average scores on PU uses?

2. The various functions/roles of the current gestural markers:
   - Per corpus (CorpAGEst-LSFB-FRAPé), per language (SL-SpL), and per participant (four signers and eight speakers).
     - ❖ Corresponding research questions guiding such analyses: for what kind of communicative purposes are these gestural units used? (i) Their overall functions covering the four domains of language (viz., IDE-STR-EXPR-INT), when appropriate; and (ii) their specific functions, zooming into the interactive functions only and those complex double functions involving the interactive domain. Are there any significant differences between languages among the three groups investigated and between participants?

3. Lastly, the possible existing combinations between manuals and other investigated resources, viz., the number of words/gestures and the number of signs produced in relation with holds, or the association of specific gaze directions with specific interactive functions:
     - ❖ Corresponding research questions guiding the analysis: are signers' gestures typically performed in coordination with specific gaze directions? What about speakers' gesture combination with gaze directions? Are there differences (or similarities) in this regard between different types of gestures, participants, corpus groups, or languages?

This chapter constitutes the methodological building blocks of what comes next, viz., the presentation of the analyses and the results. Indeed, in Part III, the results are outlined in each chapter that explores a specific manual movement, namely, the PU in chapter 3, the IFE-G in chapter 4, and holds in chapter 5. Gaze direction is addressed in a separate section in each of these chapters.

Part III
Analytical Framework

FOR EXPLORING GESTURE IN LANGUAGE: A STUDY OF PALM-UP, INDEX FINGER-EXTENDED GESTURE, AND HOLDS

The previous section laid out the methodological choices that guided the annotations and categorization of a series of manual phenomena analyzed across the corpora. The following chapters provide a more in-depth analysis at the quantitative and qualitative levels. More specifically, the aim here is to give the reader a detailed insight into the behavior of the following units of analysis investigated within the frame of this dissertation: the PALM-UP, the Index Finger-Extended Gesture, holds, and the co-occurrence of gaze directions with these three manual forms within and across the languages and modalities under scrutiny. To this end, the following aspects of these units of analysis are examined: distribution and frequency, mean duration, respective discourse functions, and the interactive functions in a signed *vs.* spoken conversation, with the aim to compare cross-linguistically how these gestures participate in the management of social interaction.

Results are reported accordingly for each gestural phenomenon: first, by language (LSFB *vs.* BF) to account for any possible effect of the language between participants of a signed language or spoken language. Then, by corpus group (LSFB, FRAPé, and CorpAGEst) to observe any impact of the protocol and setting, which differed between LSFB signers and FRAPé speakers on the one hand (in a lab), and CorpAGEst speakers on the other (at home). Lastly, by participant (eight speakers *vs.* four signers) to unveil any idiosyncratic and heterogeneous uses of these gestural phenomena, as idiosyncrasy is one of the characteristics of gesture use (as sustained in various studies, see Kendon, 2004; McKee & Wallingford, 2011; Mesch, 2016; van Loon, 2012).

CHAPTER 3
What's Up With Your Hands?
AN INTERACTIVE STUDY OF PALM-UP IN LSFB AND BF INTERACTIONS

Palm-ups – in all their ubiquity and multiplicity of meanings –
present a critical case study for scholars of visual-bodily communication
(Cooperrider et al., 2018, p. 2)

1 Preliminary Remark

Looking at the myriad of ways people make use of their hands as they interact with each other, there is one special kind of gesture that ubiquitously appears in conversation. This gesture, dating back as far as Quintilian's and de Jorio's descriptions of the form (see Kendon, 2004, for historical overviews), is most of the time referred to as "PALM-UP" (PU). This manual gesture has been attested and described in a wide range of speaking and signing communities around the world. The present section describes the different accounts of PU in both spoken and signed languages, and reports the results obtained for the languages under study: LSFB and BF. More specifically, after laying the foundations for its definition, the following subsections will provide a modern overview of the literature on PU in SpLs, on the one hand, and SLs, on the other, including a description of its form and the main discourse functions reported thus far. A last section will present the results, first in the BF multimodal spoken datasets, and then in the LSFB data.

The choice to select the PU gesture as one of the main units of analysis for this study to address the issue of gesture in SL compared to spoken data was made for several reasons. Despite the pervasiveness and shared kinesic features of PU across signing and speaking communities, these facts do not always make it easy to pinpoint its exact meanings and functions in communicative contexts. Despite this difficulty, "[p]alm-ups [still] present a critical case study for scholars of visual-bodily communication" (Cooperrider et al., 2018, p. 2) in the sense that they bridge the gap between gesture, sign, and language.

PU constitutes common ground for its analysis in the two languages examined in this dissertation. And yet, the bulk of research dedicated to its analysis still lacks substantial contrastive approaches, that is, not only comparisons of PUs between several SpLs and SLs, respectively, but also analyses of SpLs contrasted with SL data to obtain results across languages and modalities. Cooperrider and colleagues (2018) have emphasized this urgent need for more contrastive work:

> [PU analyses] have sometimes been made in mutual isolation from each other, often using different analytic frameworks and pursuing different ends. Work on Palm-Ups as used by speakers, for instance, has often been carried out independently from work on Palm-Ups as used by signers (p. 2).

Moreover, previous research point to the fact that, unlike content-oriented gestures, PUs are interactional in nature (Cooperrider et al., 2018; Teßendorf, 2014). Several accounts in gesture and SL research have shed light on multiple discourse functions of PUs including – but not limited to – expressing stance, establishing cohesive and coherent relations, and regulating turns. While most studies have focused on the textual, structuring, and modal functions, interactional ones have remained largely undocumented thus far. Hence, this study on PU is an attempt to provide additional information on and contribute to a better understanding of its interactive roles in the two languages investigated.

The organization of the following sections is presented as follows: first, the definition of PU adopted in this framework is provided. The definition suggested here is used to denote the use of PU in both LSFB and BF. Then, existing observations in the literature of the PU as used by speakers in SpLs and by signers in SLs are outlined, followed by a succinct outline of the methodological choices made for the selection of PU. Presentation of the quantitative results and the qualitative discussion are reported in the last section.

2 Definition and Terminology

A frequent gesture found in spoken and signed discourse is PU (Kendon, 2004; McKee & Wallingford, 2011; Müller, 2004; van Loon, 2012). PU usually results from a wrist rotation and is articulated with one or two flat hand(s) with the fingers more or less extended in neutral space in front of the speaker's/signer's body (see Fig. 25). However, next to this canonical representation of PU, other versions of the form may occur (see section 5, this chapter).

Fig. 25: Canonical version of PU (two *vs.* one-handed form) in LSFB (left) and BF (right).

No systematic way to refer to PU in SpLs and SLs was found in the literature. As perfectly stated by Cooperrider et al., "in both gesture and sign, Palm-Ups exhibit wide diversity in form, puzzling multiplicity in meaning, and vexing variability in the terminology and frameworks used to characterize them" (2018, p. 3). In SpLs, PUs have been referred to as "palm-revealing" and "conduit" gestures (Chu et al., 2014), "hand flips" (Ferré, 2012), "palm up open hand" gestures (Müller, 2004), the "open hand supine" gesture family (Kendon, 2004), and the like. In classifications, scholars have coined them as "recurrent" (Müller, 2018), "pragmatic" (Kendon, 2004), and "interactive" gestures (Bavelas et al., 1992). Because PU is also observed in SLs, it is important to note that some researchers have claimed that it "has grammaticalized along the lines of a modality-specific grammaticalization path from co-speech gesture to functional element" (van Loon et al., 2014, p. 2135) (for further information on the grammaticalization of gesture into SL systems, see van Loon et al., 2014). Therefore, in SL research, PU has been ascribed both grammaticalized uses as a sign but also as a co-sign gesture (McKee & Wallingford, 2011) and has received labels including – but not limited to – the "presentation gesture" in Danish Sign Language (DTS, Engberg-Pedersen, 2002), "indefinite particle" ("part:indef" by Conlin et al., 2003) and WELL in ASL (Hoza, 2011). Given the contrastive nature of the present analyses between LSFB and BF, either the ID-gloss "PALM-UP" in the examples drawn from the corpora or the abbreviation "PU" will be used to refer to it throughout this study for both spoken and signed data.

PU has been attested in a wide range of signing and speaking communities, which seem to use PUs with similar forms and functions across languages and cultures. The form is extremely pervasive[27]. For instance, Chu et al. (2014) investigated individual variation in gesture production, and more specifically, they measured the relationship between the participants' cognitive abilities and empathy levels (as predictors) along with the frequency and saliency of their gesture. 129 English British speakers in total took part in the study and were tested on a range of cognitive tasks. While this study was conducted in an experimental setting (*vs.* spontaneous natural conversations), the authors reported that out of their three tested categories of gestures, namely representational, conduit, and palm-revealing, two of these having the PU form accounted for 24% of the total number of gestures (8000 gestures performed by all participants). The frequency of PU has also been reported for analyses in SLs, including BSL (Fenlon et al., 2014), Auslan (Johnston, 2012) and NZSL (McKee & Wallingford, 2011) where PU represents the second most frequently occurring sign. In STS, PU was found to be the third most frequent item (Börstell et al., 2016), and the fifth most frequent gloss in the LSFB Corpus (Gabarró-López, 2017).

Such pervasiveness is not limited to specific geographic areas. Individuals beyond Europe (Asia, Africa, South America, and elsewhere) produce this manual form to express a wide range of meanings as part of their communication. Within signing communities, the PU is used among signers from remote regions as well as in emerging languages, "including the so-called "shared" sign systems of villages with high rates of hereditary deafness and the idiosyncratic communication systems innovated by profoundly deaf people who grow up without access to conventional sign language, called *homesigners*" (Cooperrider et al., 2018, p. 2). For now, a review of PU in SpLs is introduced.

3 PU in Spoken Languages

There are descriptions of PU that date back as far as Quintilian's description of gestures' functions in oratory (see Kendon, 2004 for a comprehensive historical review on gesture). However, among SpL research, the PU has received particular attention from scholars such as Kendon (2004) and Müller (2004).

Kendon (2004) divided the PU (also mentioned as "the open hand supine" family of gestures), into three sub-categories that fulfill specific pragmatic functions according to differences observed in movement, namely palm-presentation, palm-addressed, and palm-lateral gestures. Other researchers have called some of these categories

[27] It is relevant to point out that the results obtained for the frequencies of PU in the following studies are affected by different variables. For instance, the type of tasks and data elicited, the type of setting (experimental *vs.* spontaneous conversations), the degree of familiarity between participants (family *vs.* friends *vs.* strangers), as well as the context (formal *vs.* informal) – to only list a few factors – influence gesture frequency.

differently (the corresponding terms are put in parentheses when necessary). The three sub-categories are as follows:

1. **Palm-presentation gestures** (or Cooperrider et al.'s PU "presentational category" (2018)) correspond to moving the upturned palm toward the addressee, as if presenting something. They are usually one-handed and performed within the locutor's frontal space, often followed by a hold (Kendon, 2004, p. 265). It is mentioned that these gestures serve to offer, receive, or give topics of talk.
2. **Palm-addressed gestures** also correspond more to one-handed forms directed at the addressee. This category serves as an explanation, comment, justification for something, or an introduction of what the speaker is about to say, and includes pointing.
3. **Palm-lateral gestures** (or Cooperrider et al.'s PU "epistemic category" (2018)) involve a rotation of the forearms that separates the hands from each other so that the palms face upward. Functions of this group reveal the speaker's unwillingness or inability to intervene in a given context. Kendon, (2004) notes the apparent relationship between shoulder shrugs and palm-lateral gestures but does not comment further on the reason why it might coexist. A more thorough description of this affinity is found in Cooperrider et al. (2018) but falls beyond the scope of the present discussion.

Kendon (2004) lists four pragmatic functions:

1. **Modal**: to show certainty, possibility, and hypotheticality.
2. **Performative**: to illustrate "the kind of speech act or interpersonal move the speaker is engaged in", such as offering or suggesting.
3. **Parsing**: to punctuate the different units of a stretch of speech.
4. **Interpersonal/Interactive**: to manage the participants' roles in interaction and the sequences of turns at talk.

Müller (2004) provides a detailed account somewhat different from Kendon's (2004) description in that she does not divide the PU into distinct variants based on motion, but rather considers it as part of an extended family of gestures: the "Palm-Up Open Hand" family. Additionally, she does not further explore the shrug co-occurrence. Her main argument is that this family is "rooted in practical actions of giving and receiving objects" (cited in Cooperrider et al., 2018, p. 5). In her theoretical framework, such gestures are metaphorical.

Kendon's and Müller's conceptions of PU are echoed in Streeck's (2009) analysis. For instance, in line with Kendon (2004), he mentions the shrug co-occurrence and, similar to Müller (2004), he highlights the metaphorical aspect of PU. However, Streeck (2009) differs in that he observes PU uses within specific kinds of interactional practices, an area that has also been examined in some SL accounts of PUs (e.g., DTS, Engberg-Pedersen, 2002).

Others such as Chu et al. (2014) have examined the relationship between a person's cognitive abilities and their empathy levels along with the frequency and saliency of three types of gestures, namely representational, palm-revealing, and conduit gestures. The last two can be related to Kendon's "palm-lateral for palm-revealing gestures" (Cooperrider et al.'s "PU epistemic"), and "palm-presentation for conduit gestures" ("PU presentational" in Cooperrider et al.'s terms (2018)). The three functions Chu and colleagues (2014) attribute to palm-revealing gestures are: (i) uncertainty, (ii) resignation, and (iii) showing to the addressee that the speaker has nothing left to say. Like Streeck (2009), these authors follow Müller's (2004) conception of metaphor.

Cooperrider et al. (2018) fall within this strategy as well. They draw a line between what they refer to as "Palm-Up epistemic" gestures (similar to Kendon's "palm-lateral" and Chu et al.'s "palm-revealing" gestures) and "Palm-Up presentational" gestures (Kendon's "palm-presentation" and Chu et al.'s "conduit gestures" (2014)). Cooperrider and colleagues present a very detailed overview of the literature on PU in both systems of communication, spoken and signed. Cooperrider et al.'s (2018) paper tackles these issues further by attempting to unveil more information on the origin of these bodily communicative forms, as well as the ways they have become a source for integration into sign language communities. Their focus, however, lies on the epistemic variant of the PU form. While both epistemic and presentational forms occur in SpLs and SLs, only the former seems, according to them, "to be much more widely incorporated into sign language grammars (e.g., as question-markers or modals)". One reason for this is that the epistemic variant of PU "has several highly conventional, readily glossable uses", such as "I don't know" (p. 4) and a noticeable affiliation with the shoulder shrug.

This is where Cooperrider et al's (2018) objectives and the current ones go their separate ways. The focus here is not on the historical and diachronic changes of the PU form over time nor on the hows and whys such a form has come to be more incorporated into SL systems. Instead, the focus of the present research is on the synchronic comparison of the presentational variant of PU, which includes "palm-addressed" gestures (Kendon, 2004) as well as other forms (e.g., Gun Handshape PU; Shaw, 2019). As will become clear after reviewing PU's functions in other SL studies, most of the observations conducted on PU's uses thus far have narrowed their observations to the modal variant of PU.

4 PU in Signed Languages

PU has been examined in the following SLs: DTS (Engberg-Pedersen, 2002), ASL (Conlin et al., 2003; Hoza, 2011), Turkish Sign Language (TİD; Zeshan, 2006); NZSL (McKee & Wallingford, 2011), NGT (van Loon, 2012), Norwegian Sign Language (NTS; Amundsen & Halvorsen, 2011), LSC (Gabarró-López, 2017, Jarque et al., 2013), STS (Mesch, 2016), VGT (Van Herreweghe, 2002), and LSFB (Gabarró-López, 2017; Notarrigo, 2017).

Other works on PU in LSFB, adopting different approaches, include two research projects that investigated the PU gesture in signers' discourse. The first study devoted to PU is Notarrigo's (2017) work on the use and behavior of a series of disfluency markers in LSFB among three groups of signers: native, near-native, and late. One of the features she investigated as a potential disfluency marker was PU. Notarrigo examined PU's frequency, duration, roles, and position within turns-at-talk. She argued that PU could be seen as a potential discourse marker or a hesitation marker. Her results suggested that PUs were, on average, very frequent (around 8/100 signs) but her results did not allow to draw a clear-cut distinction as regards PUs' distribution and duration scores between the groups of signers, whose ages of acquisition of LSFB differed.

On another note, Gabarró-López (2017) investigated the PU gesture from a contrastive perspective as a discourse marker candidate (along with the study of the fully lexical sign SAME and partly-lexical signs BUOYS) in LSFB and LSC. Gabarró-López studied the following variables regarding PU: its variation in frequency of occurrence, in genres (viz., expository, narrative, argumentative, and metalinguistic), and in signers; as well as the functions PU holds in discourse, the function-position dynamic in LSFB, and how all of these elements compare contrastively to those used by LSC signers. Her results echo previous research on PU. She found that PU is the most multifunctional item under study, which fulfilled up to 19 functions (out of which, punctuating discourse and closing a signing turn were the most frequent). However, as regards signer variation, the use of PU as a discourse marker seemed to be influenced "neither by age group nor by gender" (2017, p. 344), which contrasts with McKee and Wallingford's (2011) study on NZSL.

In DTS, Engberg-Pedersen (2002) focused on what she called "the presentation gesture". Similar to Conlin and colleagues' (2003) account of PU in ASL discourse, she also claims that the PU form appears in some well-defined lexical signs in DTS, including WHAT and WHERE. Her study, however, examines PU as a gesture within interactive sequences. The PU in Engberg-Pederson's (2002) analysis is seen as "presentational" and a "materialization of the conduit metaphor" (p. 143). The different functions found as part of her analysis are: opening a turn, providing and eliciting backchannels and agreement, expressing modality and stance-taking, functioning as a hesitation marker, and as a connective device between sentences, predicates, and topics.

In STS, Mesch (2016) examined a particular interactive function of PU in the productions of 16 signers, with a focus on backchannel responses. Her findings corroborate Engberg-Pedersen's (2002) as regards PU's roles as a backchannelling expression. Mesch's (2016) findings revealed that PU occurred as the fourth most frequent manual item signaling such a function in STS conversation. Another interesting finding is that PU does not only occur in the neutral space, in front of the signer's body, but can also be used on the lap, in the lower location of space, "not to direct the attention away from the primary signer" (Mesch, 2016, p. 13).

McKee and Wallingford (2011) studied the PU as a discourse marker in a conversational corpus of NZSL produced by 20 signers, for 5000 signs in total. In their account, the researchers labeled the form as "frequent and multi-functional" (2011, p. 240). They found PU to be very frequent (the second most frequent item in their data), age-sensitive (older signers used PU more often than younger participants), as presenting "phonological alternations in usage, including final lengthening, combination with index, location, assimilation and agreement perseveration" (2011, p. 223). Moreover, as regards PU's functions, the authors found that PU can carry the following functions in NZSL discourse: cohesive, modal, interactive, and as a frame for mouthed words. Comparable to Engberg-Pedersen (2002), the authors laid the emphasis on the position of the form and its functioning rather than on its invariant meanings.

In a study of PU in NGT, van Loon (2012), in addition to depicting PU's form and articulation, describes in more detail its frequency, functions, and position in discourse.

Among the major discourse functions she establishes based on McKee and Wallingford's (2011) typology, she divides each major category into more specific functional ones. For instance, the interactive function is further split into the following ones: acting as a pause-filler, a backchannelling expression, and as part of turn-taking as a turn-opening or closing device. In her study, she also looked at the age-sensitivity of PU use. In comparison with McKee and Wallingford's (2011) study on NZSL, her results pointed in another direction, where younger signers seemed to resort to PU more often than older signers in NGT. The same holds true for PU's discourse functions. Younger signers used a wider range of functions than older signers (see van Loon, 2012, for a review).

There is an overlap between functions of PUs identified in SpLs and those found in several SLs. Here some major works focusing on observations dedicated to the discourse functions of PU in different SLs have been briefly reviewed. Such discussion will be useful for the cross-linguistic comparison with the spoken data. Moreover, the current literature review echoes most of the discourse functions employed in the present functional categorization framework of PU, but they are presented under different functional labels. In sum, PU is extremely multifunctional and it covers a wide range of various discourse functions that can be grouped into the following major ones: cohesive, modal, interactive, as a marker for question particles, and as a frame for mouthed words.

Cohesive functions include but are not limited to: maintaining coherence in discourse (ASL; Hoza, 2011), acting as an elaborative marker or a conjunction (NGT; van Loon, 2012; NTS; Amundsen & Halvorsen, 2011), and as a logical connector between sentences indicating consequence, contrast, addition, and cause (NZSL; McKee & Wallingford, 2011). Modal functions relate to markers of modality as attested in the following SLs: ASL (Conlin et al., 2003), DTS (Engberg-Pedersen, 2002), TÍD (Zeshan, 2006), NZSL (McKee & Wallingford, 2011), NGT (van Loon, 2012), and LSC (Jarque et al., 2013). Modality relates to the locutor's stance on the uncertainty, possibility, truth, and evidentiality of information, including evaluative and epistemic stances. Other modal functions include the expression of emotions and attitudes within role shifts (NTS; Amundsen & Halvorsen, 2011). Interactive functions, especially within the turn-taking system, include initiating or closing turns, providing and eliciting backchannels (Engberg-Pedersen, 2002; Mesch, 2016), seeking agreement, and acting as a pause-filler (van Loon, 2012). Lastly, there are also cases where question particles and indefinites take up on the PU form (Conlin et al., 2003). In the former case, PU can either be used for wh-questions or yes/no questions (McKee & Wallingford, 2011). A last usage commonly reported for some SLs, such as NZSL and NGT, is that PU can be used as a frame for mouthings, that is, "as a manual correlate of mouthed English content words that are not conventionally associated with *palm-up*" (McKee & Wallingford, 2011, p. 227), or any other spoken content words depending on the language of study.

Listing these functions across spoken and signed data enables researchers to get a clearer picture of the roles of PU in the two kinds of discourse. It can be observed that most studies have focused on the epistemic variant of PU. This variant is linked to the modal functions of PU as in Chu and colleagues' (2014) or Cooperrider et al.'s (2018) studies. Cooperrider and colleagues focus on such a variant because it seems, as they write, "to be more incorporated into SL grammars (e.g., as question-markers or modals)" (2018, p .4). Yet, comparatively fewer studies have investigated the interactive mechanisms of PU in SpLs and SLs. This fourth pragmatic function described by Kendon (2004) is most of the time only mentioned in passing in papers without being further elaborated upon nor discussed properly (van Loon, 2012). Moreover, studies that dealt with interpersonal-interactive functions of PUs narrowed down their scope to functions related to the turn-taking system, and failed to address the wider functional range that is used to manage the flow of conversation and the speaker/signer-addressee relationship. The aim of this chapter is not to understand the origin and related meanings of PU, but rather to describe in more detail how it can serve interactive functions in context, beyond turn-taking sequences, across two distinct languages and modalities in Belgium.

5 Detecting PU in BF and LSFB Discourses

In section 3.3.4 of chapter 2, PU, transcribed as <PU> and articulated by the right, left, or both hands, was annotated on an independent tier in ELAN dedicated to the type of movement performed by the speaker/signer (as in Fig. 26 below). Earlier, the general definition of PU depicting the canonical form was presented in Fig. 25. However, when annotating the gesture in the data, variations in location, handshapes, and handedness were also noted (see Fig. 27 in section 5.2 below).

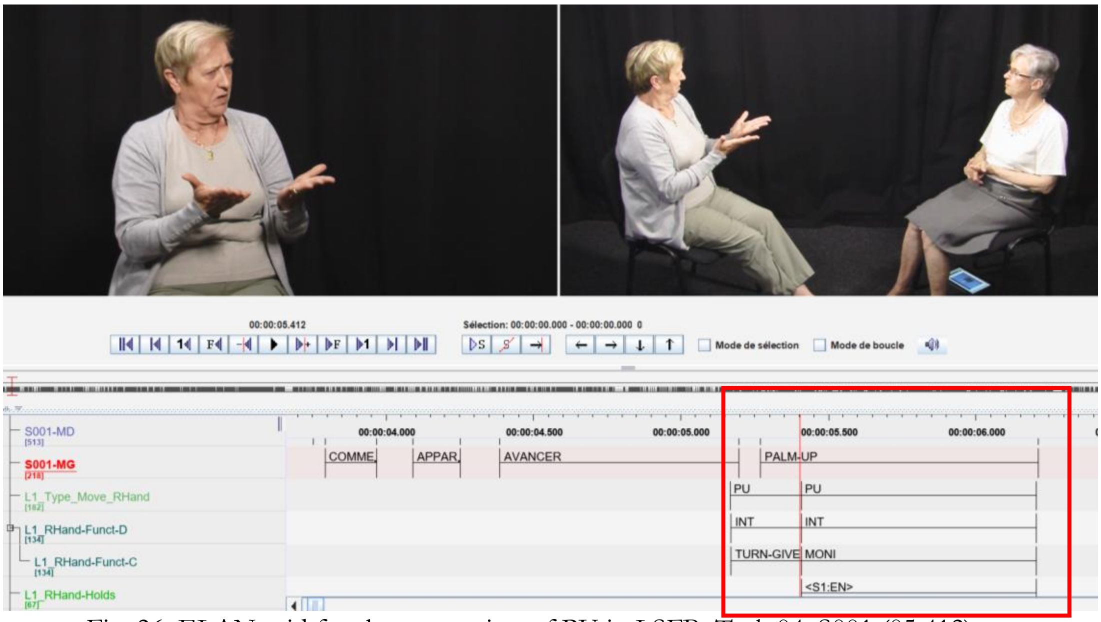


Fig. 26: ELAN grid for the annotation of PU in LSFB, Task 04, S001 (05.412).

As argued by McKee and Wallingford (2011), the canonical representation of one- or two-handed PUs varies tremendously due to several patterns affecting its articulation, including the handshape of the previous or following sign(s), speed of production, or physical constraints in the communicative situation (e.g., armchair). Therefore, certain occurrences did not match the basic definition and prototypical form presented earlier in Fig. 25. These non-canonical versions are still counted as PUs in this dissertation, and are briefly described below.

5.1 PU Identification

Most of the time, in PU articulation, there is a rotation of the wrists that brings the palms of the hands into an upward position. However, this rotation may be absent if the preceding gesture or sign has already put the hand(s) in this orientation. The same is true if the hands are already resting on the lap or on the arms of an armchair. As a result, the signer/speaker only needs to bring his/her hand(s) into the right position in space and with the right configuration to reach the PU form as displayed in the row of figures below:

Fig. 27: PU forms included for analysis in LSFB and BF.

These examples illustrate how PU can be performed from the lap (picture 1), at the speaker's side in a vertical position with the hand on the armchair (not completing the entire 180° rotation) (picture 2), or on the lap (picture 3). Another version may occur with the fingers loosely extended but gently bent, as in picture 4, for instance, where the index finger and thumb are more or less extended while the other fingers remain more curved. Shaw (2013) has referred to this form as "Gun Handshape Palm-up" and van Loon defines the form as a "5-handshape, loosely articulated, that is, little finger, ring finger and middle finger slightly bent with either and extended pointing finger or also a slightly bended pointing finger whereby the degree of bending is less that of the other fingers, palm orientation up and an outward movement" (2012, p. 67). In cases of one-handed PUs, some asymmetrical PUs where only one hand is turned upwards, were also taken into account (pictures 5 and 6).

Following Gabarró-López (2017), "reduced palm-ups" were taken into account (picture 7). Mesch (2016) has referred to this type as "weak manual activity in lap" for STS. Considering these forms allowed not to exclude potential units of meaning that have the PU form in line with the current definition of the gesture adopted in this dissertation, as well as cases in which the participant may experience age-sensitive articulatory issues (e.g., arthritis). Reduced PUs can be defined as a movement when the participant has "his/her hand on the lap and slightly rotate[s] the wrist so that the palm forms a smaller angle than 90° with the floor" (Mesch, 2016, p. 177).

As opposed to Gabarró-López (2017), the present research takes into account PU that serves pointing functions. This kind of PU is characterized by "the open hand facing upwards, fingers together or loosely extended, and a movement toward the interlocutor or toward entities that are either present or absent in discourse" (2017, p. 178), as illustrated in picture 6. This kind of gesture was counted as PU because of the association of pointing with interactive functions (see Jokinen, 2010, for an account of interactive functions of pointing in spoken interaction and Ferrara, under rev., for the same in NTS).

In the case of two-handed PUs followed by a PU hold on the left or right hand, this hold was considered as belonging to the same time period as the preceding two-handed PU. The hold occurring at the beginning and/or ending of the PU was simply annotated on a separate dependent tier. When a PU was repeated more than once with a similar handshape and orientation, the unit was considered an entire PU up until the movement of the last repeated PU ceased. The movement repetition was specified with a "+" next to the PU in question, as in [PALM-UP++] indicating that the signer, for instance, produced a PU twice in row. Along with the forms considered as PUs in the present analyses, there were also cases that were excluded and not counted as PUs. This is the case for fully-lexical signs (e.g., the LSFB signs NOW, OR, and WRITE), which are found in LSFB dictionary entries displaying hands with the PU form:

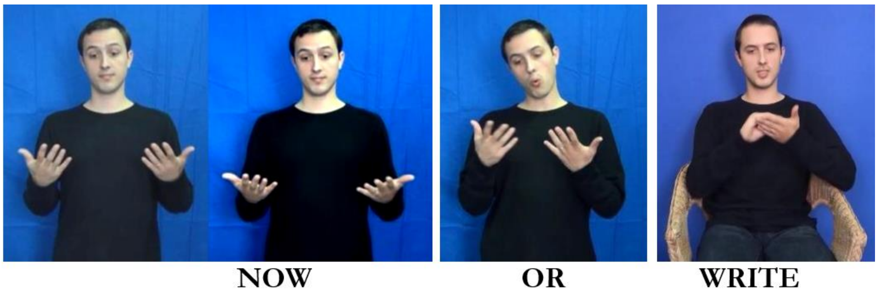


Fig. 28: Dictionary entries of PU in LSFB (http://dicto.lsfb.be/).

5.2 PU categorization

As mentioned in section 3.3.6 (see Chap. 2), all items identified as PUs in the data were categorized following previous functional typologies. Each PU token was attributed to a main domain of functions (viz., macro-function), such as interactive, and to a specific function (viz., micro-function) dependent on the macro-functions. Sometimes PU was noted to carry more than one specific function, then both functions were assigned. An IRA test was also conducted for the categorization of PU by two independent annotators in LSFB using Cohen's K, the results of which were introduced in section 3.4.4.1 of chapter 2.

In the literature, PU has been described as having no meaning on its own, only being meaningful when considered within the linguistic context along with the activation of co-occurring non-manuals: "The PALM-UP […] itself has no semantic or pragmatic impact […] the accompanying non-manual expression carries the meaning" (van der Kooij et al., 2006, as cited in van Loon, 2012, p. 27). Yet, Gabarró-López (2017) demonstrated that while some non-manuals clearly characterize certain functions of PU (e.g., agreeing), other discourse functions, such as turn closing and punctuating discourse segments, "share the same combination of non-manuals" (p.

258). Therefore, other elements such as the linguistic context and the position in discourse are compulsory to make a distinction between both functional categories: "some combinations of nonmanuals appear with particular functions, although no combination allows us to distinguish one function from another. Linguistic context and position are key to tease apart closely related functions" (p. 258). While neither non-manual activity (except for gaze direction) nor position were formally or consistently annotated for PU in the present analyses, all of these elements (non-manual cues, linguistic context, and position) were taken into account when it was time to assign one or more functions to the PU.

The next section present the analyses and the results found for the PU in the LSFB and BF data. The results are presented by language, corpus, and participant. Section 6.1 focuses on the frequencies and distributions of PU. Section 6.2 presents the results obtained for the discourse functions of PU and section 6.3 zooms into the interactive roles of PU. A last section provides a first general quantitative overview of gaze directions with PUs and then a more specific quantitative overview of gaze directions accompanying PUs' most frequent interactive functions in LSFB and BF.

6 Results

This section reports the quantitative results for PUs' frequencies. As the lengths of samples varied between corpora, two types of frequency measures were used: (1) per minute, and (2) per 100 signs in LSFB; and per 100 words in the FRAPé and CorpAGEst corpora. Next, thanks to a more detailed analysis of discourse functions of PU in context, I will be able to shed light on the similarities and/or differences of use between the three groups of participants. I will then explore its micro-functions in context, with a primary focus on the interactive functions of PU.

6.1 Distribution per language, corpus and participant

Participants produced 1000 PU tokens in total in the three sets of data in roughly 3 hr 09 min. of video-recorded material, which was fully annotated and analyzed by myself. Table 6 brings out the distribution of PU across corpora and signers/speakers:

C1 LSFB	N	/100 Tokens	/min	**C2 FRAPé**	N	/100 Tokens	/min	**C3 CorpAGEst**	N	/100 Tokens	/min
S001	99	5.58	6.11	**F001**	112	4	7.58	**C001**	51	4.26	5.3
S002	104	4.32	4.06	**F002**	35	1.83	3.07	**C002**	1	0.1	0.13
S003	67	5.08	5.7	**F003**	52	1.15	2.05	**C003**	39	2.75	3.62
S004	219	7.75	7.39	**F004**	199	4.9	7.65	**C004**	22	1.72	2.5
Total C1	**489**	**22.73**	**23.26**	**Total C2**	**398**	**11.88**	**20.35**	**Total C3**	**113**	**8.83**	**11.55**
Mean	*122.25*	*5.6825*	*5.815*	***Mean***	*99.5*	*2.97*	*5.0875*	***Mean***	*28.25*	*2.2075*	*2.8875*
SD	66.55	1.47	1.37	**SD**	74.10	1.76	1.95	**SD**	21.71	1.74	2.17

Table 6: Counts and dispersion of PU across speakers and signers in each corpus.

The distribution per language (LSFB *vs.* BF) corresponds to almost an equal tie. Signers articulated 489 PUs in all samples (49%) while speakers of spoken French (CorpAGEst and FRAPé combined) produced 511 PUs (51%) in total. As inferred from Table 6, on average, signers (in C1, LSFB) perform more PUs than both groups of speakers (in C2, FRAPé and C3, CorpAGEst). However, as measures of standard deviation (SD) reveal, the distribution of PUs is rather heterogeneous within one group of individuals, which especially holds true for CorpAGEst speakers, indicating greater intra-individual variation. A *t*-test for independent samples was performed comparing the mean consistency scores of PU per 100 tokens between LSFB signers and spoken French speakers. Levene's test indicated equal variances (F = 0.513, p = 0.490). LSFB signers produced more PUS/100 tokens on average (M = 5.7, SD = 1.47, N = 4) than speakers (M = 2.6, SD = 1.68, N = 8), for which a statistically significant difference was established (*t*(10) = 3.12, p = 0.011, two tailed). The difference of 3.1 scale units indicated a very large effect (Cohen's *d* = 1.96). When breaking down the number of PUs/corpus, almost half of them were produced by signers (49%), followed by speakers from the FRAPé Corpus (40%), and the CorpAGEst Corpus (11%). PU frequencies were calculated based on measures per minute and per 100 tokens. While the measure per 100 tokens takes into account signing and speech rate, the measure per minute does not. Therefore, the forthcoming results are presented by looking at the frequencies per 100 signs in LSFB and words and per gestural strokes in French multimodal datasets.

The first question addressed was whether there were any statistically significant differences between the three corpora – CorpAGEst speakers (Group 1), FRAPé (Group 2), and LSFB signers (Group 3) – regarding the average scores of PU/100 tokens. To answer this, a statistical test, namely, a one-way analysis of variance – abbreviated ANOVA – was conducted[28]. The results demonstrated a statistically significant difference between participants of the three corpora (F (2.9) = 4.787, p = 0.038). A Bonferroni post-hoc test was further applied and revealed a significant difference between signers from the LSFB Corpus who performed statistically more PUS than CorpAGEst speakers (p = 0.049). By contrast, no statistically significant differences were found between LSFB and FRAPé participants (p = n.s.), and FRAPé and CorpAGEst speakers (p = n.s.). The difference between LSFB and CorpAGEst participants is relatively close to the statistical threshold (p = 0.05). This result is kept in mind when further investigating the differences between LSFB and CorpAGEst at other levels of analysis, e.g., discourse functions of PU.

Before turning to PU's roles in LSFB and BF conversations, the number of PUS produced by participants in the data is examined. Signer S004 in the LSFB Corpus articulates most PUs, with almost 8/100 signs on average, followed by signers S001 and S003 who perform 5.58 and 5.08 PUs/100 signs, respectively, and finally signer S002 with 4.3 PUs on average. For speakers, the number of PUs per 100 words and per gestural strokes is relatively more scattered in each group. For FRAPé data, F004 articulates almost 5 PUs/100 words, followed by F001 with 4 PUs/100 words, and F002 and F003 with 1.83 and 1.15 PUs/100 words, respectively. As regards the number of PUs out of the number of gestural strokes, F001 produces 2 PUs every 5 strokes, F002 uses 1 PU every 5 strokes and F004 every 4 gestural strokes. F003 is the one who articulates only 1 PU every 13 gesture strokes. In CorpAGEst, C001 produces most PUs/100 words (4.26) and 1 PU every 3 strokes, followed by C003 and C004 (2.75 and 1.72). C003 also produces 1 PU every 3 gestural strokes while C004 only produces 1 PU every 13 strokes as F003 in FRAPé. The particular behavior of C002 is worth mentioning. She only produces 0.1 PU/100 words in the entire set of data. In fact, only one occurrence was found for that speaker. It seems that she prefers to resort

[28] Preliminary conditions for one-way ANOVAs: normality of distribution, homogeneity of variances, and independence of observations.

to other gestural markers, especially non-manuals, to accompany her discourse (e.g., shoulder shrugs and facial expressions, see Bolly et al., 2015, p. 13).

Fig. 29 below illustrates these tendencies (circles are for CorpAGEst, diamonds for FRAPé, and triangles for LSFB):

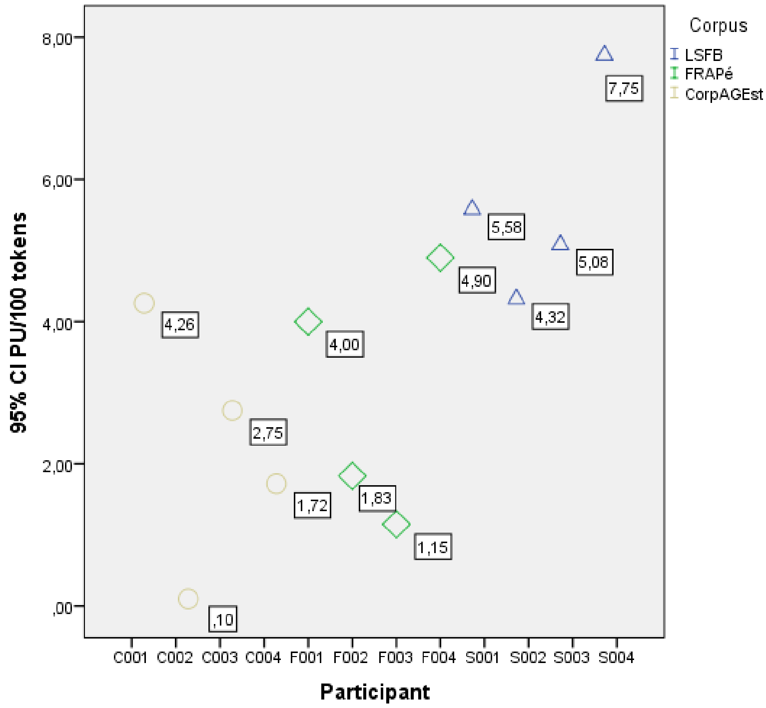


Fig. 29: Counts and dispersion of PUs/100 tokens across speakers and signers in each corpus.

Table 6 and Fig. 29 displayed the proportion of PUs among participants but they did not provide a more detailed presentation of PU's handedness, that is, one- *vs.* two-handed forms of PU. Fig. 30 illustrates such usage:

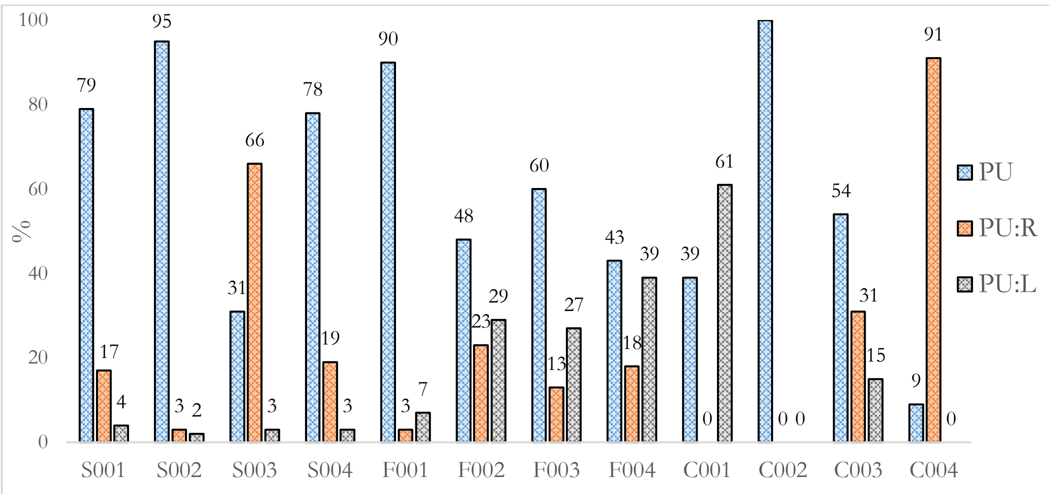


Fig. 30: Percentage of one- *vs.*. two-handed PUs across speakers and signers in each corpus.

It brings out the proportion in percentages of one- *vs.* two-handed forms of PU by speaker and signer in the entire set of data. The overall tendency is that for all participants most PUs are two-handed, except for signer S003 (who produces 66% of his PU tokens with his right hand), and the following speakers: C001 and C004, who prefer one-handed variants (the left hand for C001 and the right hand for C004). S003's preference of the right hand to produce PU can be linked to the uses deployed by that signer to provide backchannel responses. As it will be seen from the analysis of the interactive functions of PU, S003 produces most PUs to show his understanding and following. On average, the vast majority of one-handed PUs are produced with the right hand rather than the left one (except for F001, F002, F003, F004, and C001). Interestingly, all FRAPé speakers produce more one-handed PUs with their left hands. McKee and Wallingford (2011) suggest that "idiosyncratic style may also be a factor in one- or two-handed production […] as well as phonological environment [for signers]" (pp. 224-225).

All in all, the number of PUs produced in the data (presented in Table 6 and Figs. 29 and 30) do not allow for making a clear-cut distinction between the three sets of participants gathered in each corpus. Therefore, the following section concentrates on a more fine-grained analysis of the functional behavior of PU in the discourse of signers and speakers to observe PU's functioning on another level.

6.2 Discourse functions of PUs

I now turn to the analysis of PU'S discourse functions, where each category listed in section 3.3.6.2 of chapter 2 is examined. The aim is to observe whether the use of PU in context differs – or is similar – between LSFB signers and BF speakers. All PU tokens were attributed to a main category and a specific function. First, results in LSFB are presented, followed by results in spoken BF.

6.2.1 Discourse functions of PU in LSFB

Table 7 below provides an overview of the macro-functions used in LSFB:

Function Domain	N (Tokens)	% (n = 489)
Interactive [INT]	203	41.5
Expressive [EXPR]	193	39
Ideational [IDE]	37	8
Structuring [STR]	29	6
[INT]+[EXPR]	26	5.3
[INT]+[IDE]	1	0.2
Total	489	100

Table 7: PU distribution by number and percentage across the main discourse functions in LSFB.

With a percentage of 41.5, PU in LSFB is mainly used with an interactive function, viz., as the direct interactive management of the exchange and the signer-addressee relationship (203 tokens). Nevertheless, the expressive function (expressing the signers' subjective attitudes, emotions, stance) follows closely with a percentage of 39%, representing the second most frequent function of PU in LSFB (193 tokens).

Additionally, PU serves an ideational function, that is, as an expression of the semantic relations between real-world events, in 8% of the total amount of PUs, and a structuring function of discourse in 6% of cases. As pointed out in previous literature (McKee & Wallingford, 2011; van Loon, 2012), PU can carry more than one function. McKee and Wallingford (2011), for instance, put forward that expressions "of modality or epistemic stance can have interactive purposes in dialogue" (p. 227). In such cases, double tags were attributed (from two different domains, or two different functional categories from the same domain). In the results, the most frequent combination found is that of the interactive and expressive functions of language (5.3%, 26 tokens), and, to a lesser extent, that of the interactive and ideational ones (0.2%, only one token). A case in point is S004's two-handed PU in (2). This participant produces most of [INT+EXPR] cases (14 out of 26).

In (2), both signers talk about the roles of women in the job market. S003, S004's addressee, says that people who work in post offices are mainly female. S004's response to that statement is that more and more post offices and libraries are closing nowadays. He ends his reflection with the rhetorical question:

(2) S004: EVOLUTION FUTURE WHAT **<PALM-UP>**
Toward what kind of future are we heading?

EVOLUTION FUTURE WHAT <PALM-UP>

Fig. 31: PU expressing ATT and TURN-CLOSE in LSFB, Task 18, S004 (13:56-13:59).

At the end of his utterance, S004's hands take the form of a PU accompanied by a shoulder shrug before his hands go back to rest position. In addition to the manual PU marker and the shoulder shrug, other non-manual expressions come to complete the interpretation of the present function. This is particularly the case of his head that is slightly tilted toward the end of the utterance accompanied by a downward gaze direction and a slight move of the lips downward. This PU is both a marker of stance (linked to the expressive function of language) and a marker of turn completion (interactive function). The PU meaning is conveyed via the combination of both the linguistic context (indicating a turn completion) and the non-manual device (viz., a shoulder shrug conveying stance as well as the other non-manual articulators, namely, head, eye gaze, and mouth movements). Once S004's hands reach his lap, S003 understands this as a cue to take over the floor, and the conversation resumes.

The findings in Table 7 echo previous research on PU's macro-functions in discourse, especially as regards the interactive domain being the most frequent function in several SLs (in LSFB, Gabarró-López, 2017; in NZSL, McKee & Wallingford, 2011; in NGT, van Loon, 2012).

6.2.2 Discourse functions of PU in BF

Table 8 brings out the distribution of the macro discourse functions of PU as used by speakers from the FRAPé and CorpAGEst corpora together:

Function Domain	N (Tokens)	% (n = 511)
Expressive [EXPR]	196	39
Interactive [INT]	178	34.8
Ideational [IDE]	64	13
Structuring [STR]	43	8
[INT+EXPR]	13	3
[INT+IDE]	5	1
[STR+EXPR]	3	0.6
[IDE+EXPR]	2	0.4
[IDE+STR]	1	0.2
Total	511	100

Table 8: PU distribution by number and percentage across the main discourse functions in BF.

The proportions above suggest that the main discourse function of PU in BF is expressive (39%, 196 tokens), followed by interactive (34.8%, 178 tokens). Such results suggest that speakers resort to PU as an accompanying device in expressing stance-taking when they speak, and as an involvement strategy with the addressee. Lastly, the least frequent discourse-marking functions for spoken BF are the ideational and structuring domains of language with 13%, 64 tokens, and 8%, 43 tokens, respectively. Yet, compared to signers' distribution, speakers seem to use PU slightly more often to structure discourse segments and to express objective conceptual relations between real-world entities and/or events in their discourse.

Regarding double functions, referred to as "complex" as they combine more than one single function, (e.g., in (2)), speakers do not use PU to combine functions in the same way as signers do, in that speakers use a wider range of double combinations while signers only combine the interactive function with the expressive and ideational domains. Despite speakers using a more diverse range of complex functions, they do so less often (ranging from 0.2% to 3% *vs.* 0.2% to 5.3% in LSFB). Yet, in spite of these differences, there were also some commonalities. The expressive domain, in particular, is proportionally the same in both LSFB signers and BF speakers, amounting to 39% of all PUs in both languages. Regarding the interactive function, signers seem to use PU as an interactive device slightly more often than speakers (41% *vs.* 34.8%), which has been corroborated by statistical tests. A one-way ANOVA only determined a statistically significant difference between LSFB signers and CorpAGEst speakers ($F\,(2, 9) = 6.259, p = 0.020$) for the interactive functions of PUs, with signers producing more interactive PUs than CorpAGEst speakers.

However, the results outlined above do not indicate a clear-cut boundary between LSFB and BF. Therefore, the figure below provides a more detailed picture of the uses of PU broken down by participant in these two languages. It illustrates the distribution of PU according to its main discourse functions across the entire set of participants (12 in total):

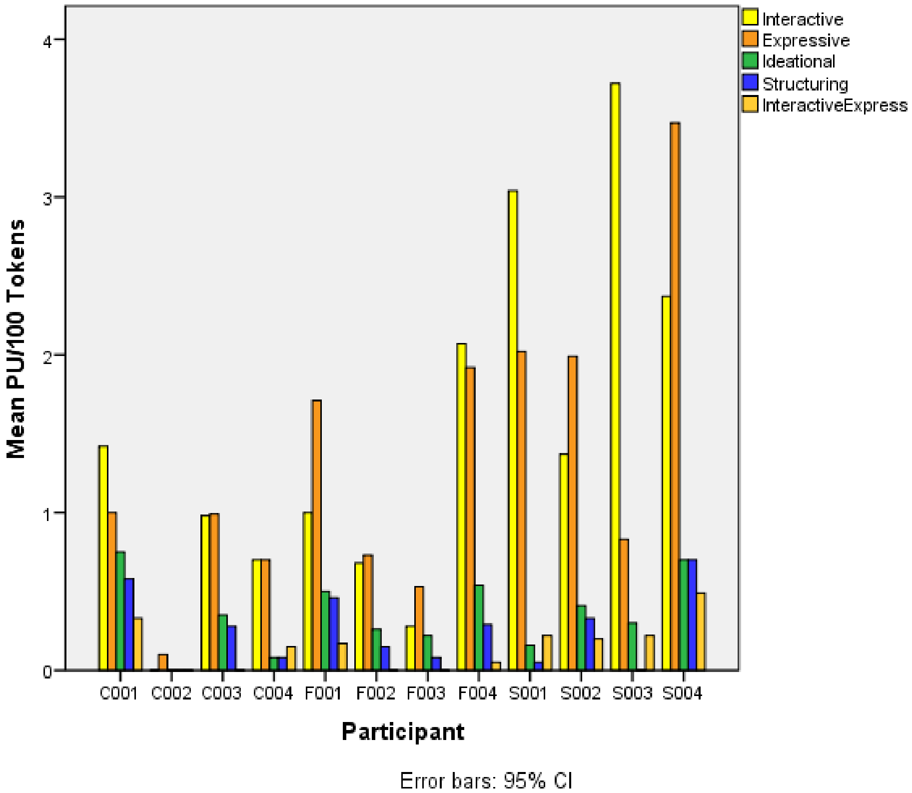


Fig. 32: PU distribution per 100 tokens across the main discourse functions by participant.

The figure above sheds light on the type of macro-function used in the discourse of LSFB signers and BF speakers. When looking at the results displayed in Fig. 32, it can be noted that all the speakers use PU mainly for expressive purposes, except for C001 and F004, for whom the expressive domain is "only" the second most frequent function, after the interactive one. In LSFB, the interesting aspect is that S003 produces almost twice as many interactive PUs/100 signs as S004; while S004 articulates three times as many expressive PUs than S003. The same tendency holds true for the pair of female signers: S001 and S002. Fig. 32 better reflects the kinds of roles that PU serves in the discourse of each speaker and signer, revealing in this way personal preferences of use as well as multifunctional aspects of PU.

6.2.3 Summary of discourse functions

The aim of this section was to provide a general overview of the different macro discourse functions of PU in LSFB and spoken BF. There was a statistically significant difference between the LSFB and CorpAGEst corpora as determined by a one-way ANOVA (F (2, 9) = 6.259, p = 0.020) for the interactive functions of PU. No other statistically significant differences were found between corpora for the other discourse functions of PU. Given that the main aim of the present research is to focus on the interactive roles of PU in LSFB and BF interactions, I will look at the diverse ways individuals manage the speaker/signer-addressee relationship with PU in signed and spoken interactions in the next section.

6.3 Zoom into the interactive dimension

The interactive function is one of the four main discourse functions of language (identified in Table 4, Chap. 2). Within this category, 13 specific interactive functions serve more specific communicative purposes. These are: (dis-)agreeing (including feedback expressions), delivery (delivering new information), common ground (expressing shared information), monitoring (expressing cooperation or checking for understanding and attention), turns-at-talk (opening, giving, suspending, closing one's turn), and planning (revealing the participant's cognitive effort in editing terms or in processing "speech", such as hesitations, word searching activities, pause fillers, including Bavelas et al's (1995) "seeking help" gestures). Other less frequent interactive categories include digression (viz., information to be treated as aside from the main point), elliptical (viz., category of general extenders: "or whatever"), and face-saving (viz., expressing politeness and preventing face-threats).

6.3.1 In LSFB

Functional Category Interactive [INT]	**N**	**% of interactive PU (n = 230)**
Agreeing	65	28.2
Turn-Closing	40	17.4
Monitoring	32	14
Turn-Giving	29	12.7
Turn-Opening	14	6.1
Planning	12	5
Delivery	5	2
Common Ground	3	1.3
Elliptical	2	1
Turn-Closing + Attitude	15	6.5
Agreeing + Attitude	5	2
Planning + Attitude	3	1.3
Monitoring + Attitude	2	1
Turn-Closing + Monitoring	1	0.5
Deixis + Monitoring	1	0.5
Monitoring + Emotion	1	0.5
Total	230	100

Table 9: Number and percentages of PU's interactive functions in LSFB.

According to the distribution in Table 9, the most frequent functions in LSFB used for interactive purposes are: showing agreement (including backchannels), with 28.2%, closing one's turn, with 17.4%, monitoring the addressee for attention, with 14%, and giving the turn, with 12.7%. Less frequent interactive functions include planning, delivering new information to the addressee, marking common ground, and ellipsis. The most frequent complex function seems to be of one type: the combination of turn-closing while showing attitude (see (2)).

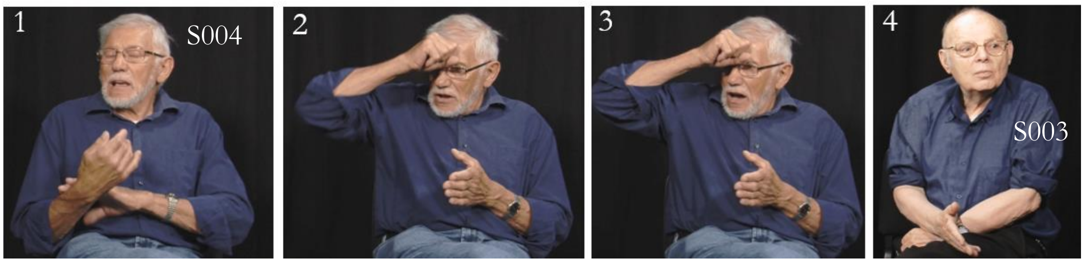
In what follows, illustrations of the three main categories of interactive functions in LSFB are provided, with the context in which the discussion takes place. The first line provides the reader with the glosses of the signs (in capitals), while the second and last lines show the English translations.

6.3.1.1 Showing agreement

In task 03, signers are retelling childhood memories. In (3), they are discussing the ways they used to celebrate Candlemas in their family:

(3) S004: PANCAKES IT'S MONTH IT'S [CANDLEMAS]
We used to make pancakes for candlemas

S003: [<PALM-UP>+]
Yes, that's it.



PANCAKES **CANDLEMAS (453ms)** **<PALM-UP>+**

Fig. 33: PU expressing AGR in LSFB, Task 03, S003 (1:51-1:58).

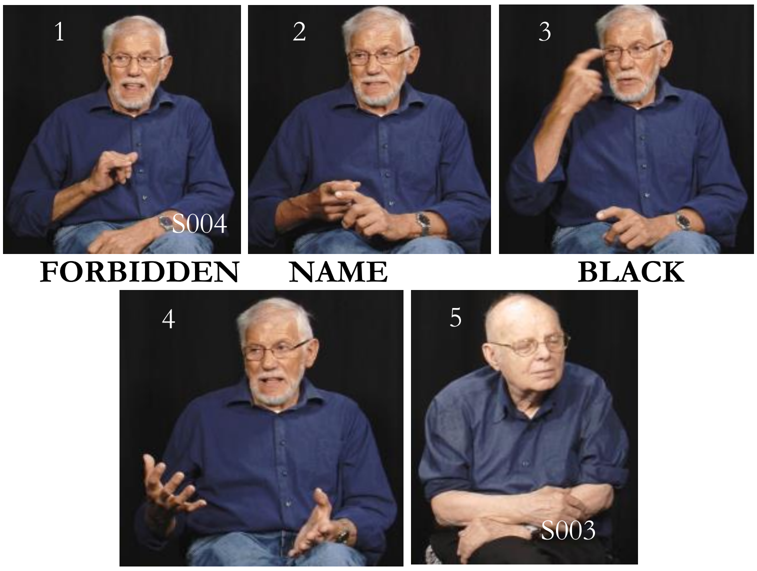
In (3), S004 articulates the sign for CANDLEMAS (pictures 2-3). On frame three, he holds this sign for 453 ms and changes his gaze toward S003. The combination of the hold and this modification in gaze direction indicates a request from S004 for S003's confirmation/approval that the event taking place around February-March is in reality called "Candlemas". On that note, S003 produces a PU (repeated twice) that expresses his understanding toward S004's statement. In fact, 38.5% of all PUs with an agreeing function were performed by S003, usually in the lower location of signing space (as in (3)). One-handed forms are also characteristic of this function to provide feedback (see section 3.4.4 in chap. 2). Moreover, agreeing is the function where most reduced PU forms occur, usually, "not to direct attention away from the primary signer" (Mesch, 2016, p. 32). Non-manual markers of this function include a gaze addressed to the primary signer accompanied by a movement of the head, usually a nod or a head tilt. Sometimes, the eyes are closed as well while the head is nodding.

In this example, the combination of the manual and non-manual activities has prompted the addressee's response to show his agreement via a reduced one-handed PU form. In this way, the addressee has become active in the interaction through his use of "backchannels […] and interactive facial displays" (Payrató & Teßendorf, 2014, p. 1532). All of this underlines the bilateral, collaborative, and social process of interactive roles of gestures in dyadic interaction.

6.3.1.2 Seeking agreement

In (4), signers are discussing construction work. S004 says it is illegal to ask for help while building a house. S003 expresses his astonishment and asks for some clarification:

(4) S004: FORBIDDEN [NAME] BLACK **<PALM-UP>**
It's forbidden because it is considered illegal employment, you see?



FORBIDDEN NAME BLACK

<PALM-UP>

Fig. 34: PU expressing MONI in LSFB, Task 04, S004 (8:12-8:16).

In (5), they debate cochlear implants and the "corrupted" system ruled by doctors:

> **(5) S001:** DEFEND **<PALM-UP>**
> We need to fight against this system, no?

DEFEND **<PALM-UP> (488 ms)**

Fig. 35: PU expressing MONI in LSFB, Task 04, S001 (7:03-7:05).

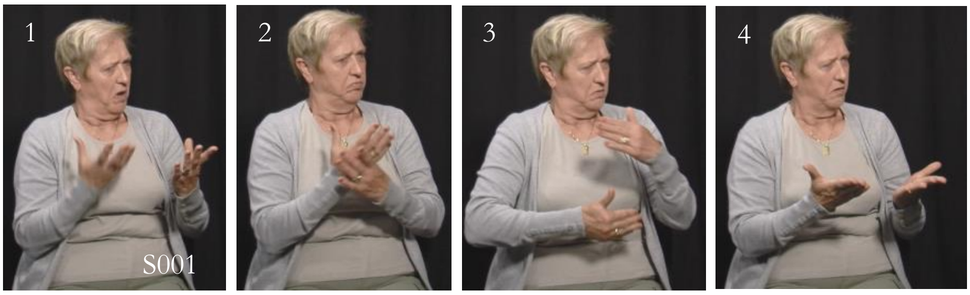
The monitoring function expresses cooperation, seeks following, or checks for understanding and attention from the addressee by the primary signer/speaker. In (5), only one lexical sign, DEFEND (picture 1), is performed, followed immediately by the PU (picture 2), with a hold of 488 ms on the PU. In (5), S001 is seeking evidence of agreement with what she just uttered (Bavelas et al., 1995) and the meaning expressed in the PU is analogous to "don't you agree with the point I just made?" In response to the PU and the subsequent hold, S002 immediately shows her agreeing response by a few head nods (picture 3).

While achieving the same interactional goal (i.e., monitoring the addressee for a response), the PU presented in (5) differs from the one in (4). In (4), in performing the rotation of both hands, paraphrased as "you see", S004 seeks evidence that the addressee – S003 – is on the same wavelength, he is thus seeking following. Such gesture also prompts a response from the addressee who nods and gives the backchannels several times to mark his agreement and/or to signal to S004 that he follows the flow of the conversation on the topic of illegal employment. These two examples highlight that the same gesture can carry the same function – monitoring – while at the same time having its own specificities in its production.

6.3.1.3 Turn management

(6) takes place at the beginning of Task 04, in which signers are asked to discuss differences between hearing and deaf cultural habits. S001 takes the floor and asks S002 how it went when she met deaf people in the street. The question ends with a two-handed PU:

(6) S001: HOW HAPPEN EVOLVE **<PALM-UP>**
How did it go for you?



HOW **HAPPEN** **EVOLVE** **<PALM-UP> (799 ms)**

Fig. 36: PU expressing TURN-GIVE in LSFB, Task 04, S001 (00.475-06.209).

Besides PU’S functions as both an agreeing and a monitoring device, it is also used to regulate the utterer’s turn-taking system: to open, give, or end his/her turn. In (6), PU can be construed as a turn offering, referred to by Goodwin (1986) as a “turn-yielding signal”. In addition, S001 holds her hands in the exact same location, configuration, and handshape characteristic of the PU for 799 ms. Moreover, this occurrence takes place in sentence-final position of a wh-question introduced by the interrogative marker HOW. As shown in previous SL studies, PU can also function as a question particle in yes/no and wh-questions (e.g., NZSL; Mckee & Wallingford, 2011; NGT; van Loon, 2012).

It is revealing to observe (5) and (6) together, where a two-handed PU is performed by S001. Both hands are brought upwards after a lateral rotation of the wrists, with the fingers together or slightly extended, addressing the addressee, S002. Both PUs occur at the end of the utterance. However, the PU in (5) aims at getting a feedback response from the addressee, while in (6), S001 ends with her palms facing upwards at the end of the wh-question, offering S002 the floor and leaving room for her reply on the hearing-deaf cultural aspects.

This finding echoes previous results regarding the interactional dimension of the relevance of addressing specific strategies in the regulation of the turn-taking system in SL (Groeber & Pochon Berger, 2014). In (6), the PU and the post-stroke hold, along with an addressed gaze, are an indication of S001’s turn completion and an invitation for S002 to take over the turn (see Baker, 1977; Groeber & Pochon-Berger, 2014; Lackner, 2009). Moreover, in (6), S001 releases her PU hold with her hands going back to rest only when the next turn has been launched by S002, which has been argued by Groeber and Pochon-Berger (2014) as non-arbitrary: “On the contrary, the timing of the release is based upon the current speaker's meticulous on-line analysis of the co-participant's conduct" (p. 9).

6.3.2 In spoken BF: FRAPé & CorpAGEst

FRAPÉ			CORPAGEST		
Functional Category Interactive	**N**	**% of INT PU (n = 148)**	**Functional Category Interactive**	**N**	**% of INT PU (n = 48)**
Delivery	54	36	Common Ground	15	32
Planning	25	17	Delivery	12	25
Common Ground	22	15	Planning	5	11
Monitoring	14	9	Monitoring	3	6
Agreeing	9	6	Elliptical	2	4
Turn-Open	5	3	Face	1	2
Suspension	5	3	Turn-Open	1	2
Turn-Close	2	1	Delivery + Abstract Deixis	2	4
Digression	1	1	Turn-Close + Attitude	1	2
Elliptical	1	1	Planning + Attitude	1	2
Turn-Closing + Attitude	4	3	Delivery + Attitude	1	2
Delivery + Abstract Deixis	2	1	Turn-Open + Attitude	1	2
Common Ground + Deixis	1	1	Planning + Delivery	1	2
Agreeing + Attitude	1	1	Monitoring + Motivation	1	2
Planning + Reformulation	1	1	COGR + Motivation	1	2
Delivery + Reformulation	1	1			
Total	148	100	Total	48	100

Table 10: Number and percentages of PU's interactive functions in FRAPé and CorpAGEst.

The functional categories to report as the most frequent ones in BF are the same in both corpora but with varying degrees of frequency of occurrence. For instance, the most frequent interactive function in FRAPé is the delivery of information considered as new and/or relevant to the main point for the addressee (36% *vs.* 25% in CorpAGEst), while the most frequent one in CorpAGEst is expressing common ground (32% *vs.* 15% in FRAPé). Lastly, both planning and monitoring addressees are among the most common uses of PU in BF, independently of the corpus. These functions are further illustrated and discussed in what follows.

6.3.2.1 Marking the delivery of new information

As mentioned previously, one of the possible interactive functions of PU is concerned with the delivery of relevant information by the speaker to the addressee (Bavelas et al*.,* 1995). In this way, the primary speaker makes a direct reference to the other participant in the conversation via the gesture performed. By signaling to the addressee the status of the information, the speaker "helps coordinate the understanding of meaning between them [speaker and addressee]" (Bavelas et al., 1995, p. 395). Among the differences standing out across LSFB and BF, the most striking one is the almost absolute absence of this function in LSFB, compared to a total of 66 tokens of delivery PUs found in spoken BF. The example below depicts how F004 delivers new information relevant to her main point to F003 in FRAPé. F003 and F004 are talking about childhood memories. F004 is telling F003 about one of the times when she was a little girl when she had made her mother very angry:

> **(7) F004:** (.h) it's one **<PALM-UP>** of the rare times when my mother was very angry.

Fig. 37: PU expressing DELIV in FRAPé, Task 03, F004 (04:29-04:30).

F004, when mentioning the naughty act she once did when she was a little girl, introduces the main topic related to this activity by metaphorically handing over this new information to F003 with a PU. This can be paraphrased as "here is what I am telling you" or "here is my point" as she relates her mother's reaction when she discovered what she had done (Bavelas et al., 1995, p. 395). The palm of her left hand faces upward and is directed toward the addressee, as if the information being delivered is being handed over on the palm of her hand. This use of the PU concurs with Chu et al's (2014) finding on what they call "conduit gestures" or "conduit metaphor gestures" in McNeill's (1992) terms. The delivery gesture in Fig. 37 is an example of this where "the palm of the hand faces upward and moves towards the listener as if to present a clearly formulated idea on the palm" (Chu et al., 2014, p. 695).

6.3.2.2 Marking shared information or knowledge

Besides delivering new information, the second most used functional category of PU in FRAPé is another kind of delivery gesture used to provide shared information or knowledge that "the speaker assumes their addressee knows, believes or is able to infer" (Wilkin & Holler, 2011, p. 295), known as common ground. In (8), F002 is telling F001 what she is doing with her son to stay healthy:

> **(8) F002:** (.h) and then after I/ we/ or when **<PALM-UP>** we take the dogs for a walk too

Fig. 38: PU expressing COGR in FRAPé, Task 20, F002 (4:09.234-823).

In (8), PU expressing common ground is combined with a pointing movement toward the addressee. The primary speaker here is using a two-handed PU toward the addressee because she is referring to information that was already shared knowledge between them prior to and outside of the current experiment (Bavelas at al., 1995; Holler, 2010). It can be paraphrased as "as you know my son and I take our dogs for a walk", because both speakers work at the same second-hand shop twice a week.

The same common ground function is found in (9) between C001 and her daughter who acts as the addressee. C001's daughter asks in what kind of context people ask C001's age, and she replies:

> **(9) C001:** like pants well I wouldn't want some pants euh (.) like teenagers are wearing nowadays and so on I say because I'm a grandmother **<PALM-UP>** (.)

Fig. 39: PU expressing COGR in CorpAGEst, S3, C001 (1:25.021-1:26.668).

(9) is a relevant example of a common ground gesture. By performing her PU, C001 reveals that her daughter is already aware of the information being transmitted, that is, that C001 is a grandmother. As she says "because I am a grandmother", her hands move from her lap and rotate toward the daughter, which can be paraphrased as "as you already know, I am a grandmother". Nothing in the gesture refers to the grandmother herself. Instead, the speaker indicates with that gesture that she undoubtedly knows that her daughter has prior knowledge of her being a grandmother.

In the example below, however, PU refers to another kind of shared knowledge. Both speakers are telling each other past memories from their childhoods. After sharing one of her misdemeanors, F004 is comparing her own exploits to what F003 used to do when she was a child and is telling her that her punishments were nothing in comparison with F003's:

> **(10) F004 :** [No] in comparison with **<PALM-UP>** being locked up in a basement

Fig. 40: PU expressing COGR in FRAPé, Task 03, F004 (5:13.009-5:14.121).

In (10), F004's PU is not referring to shared knowledge built prior to the current conversation, known as "personal common ground" (Clarke, 1996)[29], which is the "knowledge shared by particular interlocutors as a result of their prior common experience or their current situation (Holler & Bavelas, 2017, p. 214) as in (8) or (9). Instead, in (10) F004 is referring to something said earlier, to some discourse content mentioned at the beginning of the task by F003. This is what has been called "incremental common ground" (Clarke, 1996), which "is based on the interaction between interlocutors during their dialogue, specifically, the process of *grounding* – the moment-by-moment exchanges that establish information as common ground within a conversation (Clark & Schaefer, 1987, 1989; Clark & Brennan, 1991, as cited in Holler & Bavelas, 2017, p. 214). She refers back to something that has been said and she indicates it to her addressee with PU. It also falls within Bavelas et al's (1995) category of "general citing gestures", which are paraphrased as "as you said earlier", that is, that the point the speaker is now making had been previously contributed by the addressee.

PU marks common ground between participants but it can also differ in more subtle ways. In (8) and (9), the gesture refers to previous shared knowledge existing outside the dialogue, derived from personal common ground, whereas in (10), the PU derives from incremental common ground, which is the result of grounding that has been built within the dialogue itself after new information had been presented by F003 earlier. (10) shows that "mutually shared knowledge also accumulates over the course of an interaction" (Holler, 2007, p. 7).

6.3.2.3 Seeking agreement through monitoring

In (11), there is an instance of PU monitoring the addressee in spoken French. This example echoes the one presented in LSFB.

(11) C001: (1.0) it/it's annoying to be reminded of that [every single time] (.) you know **<PALM-UP>**

Addressee: [mm]

Fig. 41: PU expressing MONI in CorpAGEst, S3, C001 (4:59.149-5:05.144).

C001 performs a PU with her left hand and holds it for almost two seconds. Her hand is directed at the addressee. The PU performs a monitoring function because the speaker is checking for understanding and attention from her daughter. The hold indicates that she has not abandoned her speaking turn yet as she resumes talking soon

[29] Clark (1996) describes COGR stemming from three domains: communal, personal, and incremental (see Holler & Bavelas, 2017, for further details and information on their blurry frontiers, a discussion that goes beyond the scope of this dissertation).

after she receives feedback ("mm") from her daughter. This PU, and the reaction it provokes from the addressee, bears some similarities to (4) in LSFB.

6.3.2.4 Requesting help while searching for a word

Conversations never go smoothly. They are filled with instants of conversational troubles that need repair. The planning function conveys some of these difficulties. It underlines the speaker's cognitive effort due to a momentary inability to retrieve a specific word item or in processing his/her line of thought (e.g., pause fillers, dysfluencies, and hesitations). As argued by Goodwin and Goodwin (1986), word searching "is not simply a cognitive process which occurs inside a speaker's head but rather is a visible activity that others can not only recognize but can indeed participate in" (p. 52). This momentary inability activates gesture production and such gestures seek to solicit a specific response from the addressee. F004 is explaining to F003 that one of her teachers had cancer and had to wear a wig:

(12) F004: Yes and her hair euh (.) **<PALM-UP>** that was no longer hers [but]
F003: [but] that was well done anyway

Fig. 42: PU expressing PLAN in FRAPé, Task 03, F004 (12:33.477-12:34.533).

In (12), F004 has trouble finding her words and this difficulty is also perceptible in her speech by the filled pause "euh". When pausing (.), she goes to raise her hands from rest position in the form of a PU as she cannot find what she wants to say. Her eyes are closed as she is searching for words. Her addressee, F003, who perceives the conversational trouble, intervenes by completing F004's utterance with a suggestion that can be acceptable in the given context: "but that was well done anyway". Following that, F004 repeats the exact same words, as if F003 has provided her with the right combination she has been looking for since the beginning. It might be said in (12) that the mere act of producing the planning gesture in the shape of PU has an effect on the addressee, who provides the words "when prompted solely by the interactive gesture" (Bavelas & Gerwing, 2007, p. 292). This is to be interpreted as a successful realization of the planning gesture since the "seeking help" device is successfully interpreted by F003 who responds promptly by providing the missing words, even though F004 has not asked for assistance verbally.

Yet, the planning function can also be used in a different line of work, see (13), from the CorpAGEst Corpus. Here, C004's granddaughter is telling her grandmother that she has many grandchildren, which can sometimes be a lot of work. On that note, the speaker asks her granddaughter how many of them there are:

(13) C004: How many are there **<PALM-UP>**?

Fig. 43: PU expressing PLAN in CorpAGEst, S2, C004 (3:51.530-3:55.780).

In (13), the speaker makes a direct reference to her addressee, asking for her help with her request for the missing information via a one-handed PU. When executing the gesture, C004 repeats the same up and down move with her hand while gazing at her granddaughter with frowned eyebrows. This repeated move can be interpreted as a seeking-help device urging a response from the addressee. This type of PU is similar to (12) in that sense. Yet, it also differs from FRAPé's example. In FRAPé, F004 in (12) was experiencing conversational trouble and could not find her words, and F003 provided the information for her (without explicitly being asked). Conversely, in (13), C004 could not find her words but she made a direct PU at the addressee with an explicit request through the use of a question and a PU gesture. Such an example might suggest that PU can also be used as a question particle. These examples show that the planning function serves interactive purposes. Although PUs in (12) and (13) differ, they are both directed at the addressee in their own ways, acting as a seeking-help device to help the speaker during her word search.

6.4 Gaze direction combined with interactive PUs

The qualitative examples discussed in the previous sections shed light on a series of gaze directions that occurred in combination with PUs for different communicative purposes in signed and spoken dialogues. Among the entire set of non-manual markers, gaze direction was the only one that was formally and consistently annotated across the data for each manual form (see Chap. 2, section 3.3.4). One reason for this is the long recognition of the importance of gaze in the management of conversational activities (see Goodwin (2000) who analyzed the roles of eye gaze and body shifts in turn-taking management, for instance). Therefore, the present section provides a brief account of the gaze patterns co-occurring with interactive PU in LSFB and BF. More specifically, the question of who the target of the eye gaze is when signers and speakers articulate interactive PUs is explored. For instance, the eye gaze can be addressed to the main interlocutor, to a point in space, to an object present in the interview room, to the camera, to one of the speaker's or the addressee's body parts, or lacking direction, viz., floating.

This section elaborates upon the former observations presented in the qualitative descriptions of PU serving interactive purposes, where gaze direction was used as a descriptive add-on to the examples cited previously. The upcoming results are divided into two distinct parts. The first part introduces quantitatively the distribution of the established gaze categories co-occurring with PUs across languages and corpora. This first section aims at providing an answer to the following research question: what is the overall distribution of the categories for the direction of the gaze co-occurring with interactive PUs across languages and corpora? The second part will be devoted to the analysis of the corresponding association between interactive functions of the PU with specific gaze directions, to observe whether there is a systematic association between specific gaze directions and interactive functions.

6.4.1 Quantitative overview of gaze directions with PUs

What is the overall distribution of the categories established for the gaze directions that co-occur with interactive PUs in LSFB and BF? Do signers and speakers fall into the same kinds of categories when they articulate PU for interactive purposes or is there some variation? At the time of the annotation process, each PU token received gaze-direction labels in ELAN, which were defined in chapter 2 (section 3.3.4). Two kinds of modifications have been made to the original categories for better clarity in reading the current results. Firstly, the <COMPLEX> category comprises moments when more than one gaze direction has been annotated, that is, when participants shift their gaze direction during the production of a PU. Secondly, the <Other> category is composed of moments when the eyes are closed <CL> or when they are looking at the camera <CAM>.

Gaze distribution by language. The following figure brings out the distribution by language to pinpoint the type of direction of signers' and speakers' gazes when they produce interactive PUs.

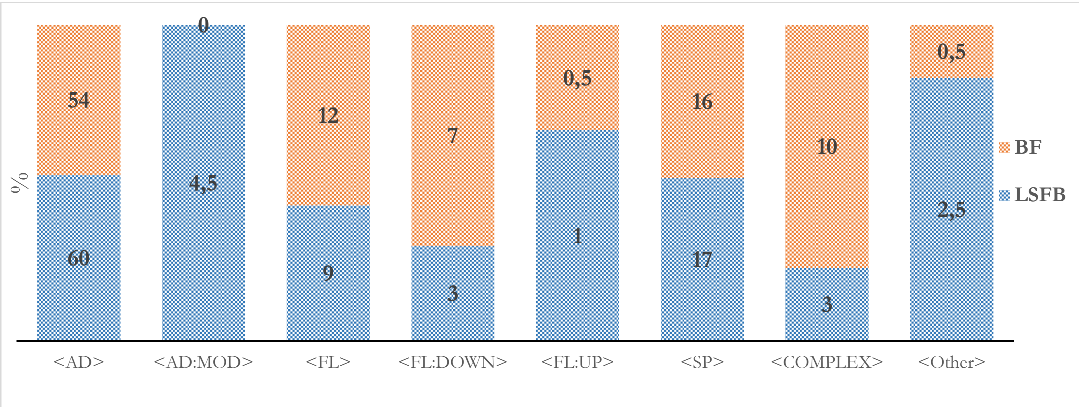


Fig. 44: Distribution in percent of gaze direction types by language.

From examining the proportions, it seems that the gaze direction is distributed quite similarly for both languages: 54% addressed gaze (<AD>) in BF *vs.* 60% in LSFB. <AD:MOD> represented only 4.5% in LSFB as sole signers look at the deaf moderator[30]. As regards floating gazes (<FL>), they constitute 12% of gaze direction in BF *vs.* 9% in LSFB; floating variants include 1% of floating up (<FL: UP>) in LSFB *vs.* 0.5% in BF, and 7% of floating down (<FL: DOWN>) in BF *vs.* 3% in LSFB. The <SP> category, that is, types of gaze that are directed at a point in space, is almost equally distributed (16% in BF *vs.* 17% in LSFB). Finally, 10% of <COMPLEX> gaze

[30] Given the nature of the methodological protocol, at the time of recording the interview (October-December 2018), a few participants had the tendency to look at the moderator to answer directly as he/she provided the general guidelines and formulated the questions.

directions characterize BF discourse *vs.* only 3% in LSFB include gaze shifts. The latter category comprises targets that changed throughout the gesture production. Thus, the gaze was first directed toward the addressee, then was floating, and then was once again directed toward the addressee, for instance. In sum, BF speakers seem to display more floating eye gaze directions and produce more gaze shifts during their articulation of interactive PUs than LSFB signers.

These results reveal that some shared tendencies are present to some extent between signers' and speakers' gaze directions combined with interactive PUs (except for the <FL> and <COMPLEX> categories that drew a clearer distinction). However, how these gaze directions combined with PUs are distributed by participant in the corpora remains open to investigation. This is why the next figures shed light on the distribution of gaze directions with [INT] PU: first, by corpus (to distinguish CorpAGEst's results from FRAPé's), and then, by participant. The aim is to look for more variation regarding these categories of gaze directions among participants regardless of their corpus or their language (signed or spoken).

Gaze distribution by corpus. Fig. 45 reveals that, on the one hand, there is some consistency among the three corpora. Both speakers and signers range between 50% and 60% of <AD> and between 12.5% and 17% of <SP> gazes when they produce interactive PUs. These two types of direction represent the most important ones in the data. The same holds true for floating eye gazes (<FL>), which range from 9% in LSFB to 12% in FRAPé and 12.5% in CorpAGEst. On the other hand, some differences also stand out. First, there are proportionally twice as many <FL:DOWN> gaze types in CorpAGEst than in the other BF dataset (11% *vs.* 5% in FRAPé), and almost four times as many than in the LSFB Corpus (3%). Secondly, FRAPé speakers change their gaze target more than the other two groups of participants, who demonstrate a fixed gaze pattern when performing interactive PUs (11% *vs.* 6% in CorpAGEst and only 3% in LSFB).

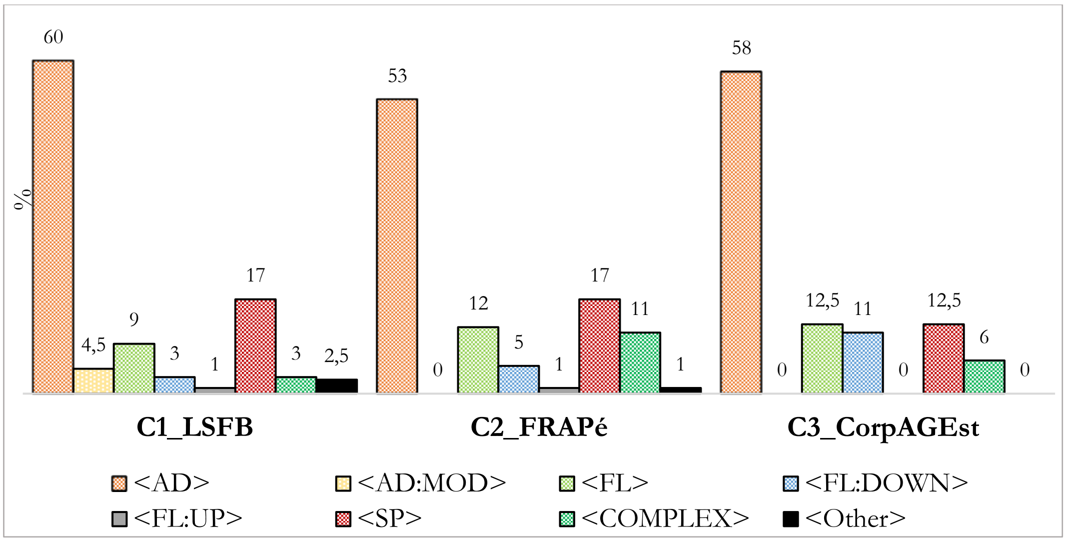


Fig. 45: Distribution in percent of gaze direction types by corpus.

Gaze distribution by participant. Do participants – signers and speakers – use the same kind of gaze categories when they produce interactive PUs, or is there an idiosyncratic usage of gaze with PU for interactive purposes? Table 11 below provides the gaze distribution by participant:

Gaze Category in %	C001	C002[31]	C003	C004	F001	F002	F003	F004	S001	S002	S003	S004
<AD>	36.5		80.5	54.5	70	69.2	27	49	85	74	79	25
<AD:MOD>	0		0	0	0	0	0	0	10	0	3.5	2.5
<FL>	13.5		6.5	18.2	3	7.7	6.5	17	0	0	2	25
<FL:DOWN>	13.5	n/a	0	18.2	6	0	6.5	6	0	0	0	7
<FL:UP>	0		0	0	0	0	0	1	0	2,6	0	1
<SP>	23		6.5	0	6	7.7	20	22	2	18.2	10	33
<COMPLEX>	13.5		6.5	9.1	15	7.7	40	5	3	2.6	3.5	2.5
<Other>	0		0	0	0	7.7	0	0	0	2.6	2	4

Table 11: Individual description of gaze direction co-occurring with interactive PUS in percent.

The first observation that stands out is the relativity high heterogeneity characterizing the gaze directions co-occurring with interactive PUS by participant. The results reveal more variation than previously shown when the data were merged by language and by corpus, as previously witnessed with the PU analysis. Here, there is a higher degree of granularity emerging between the participants' types of gaze directions and the interactive PUS.

It can be noted that, even among the most stable gaze category such as <AD> (54% *vs.* 60% in BF and LSFB in Fig. 44), there is a greater deal of heterogeneity between participants. From those results, three groups stand out. First, those that produce less than 50% of all <AD> gazes with interactive PUs (this is the case of three speakers and one signer: C001, F003, F004 and S004). Second, those who perform between 50-80% of <AD> gazes when articulating PUs: C004, F001, F002, S002, and S003. Only one signer (S001) and one speaker (C003) direct over 80% of all their gazes at the addressee when producing interactive PUs. It is not striking, though, that all participants direct roughly 50% of all their gaze directions during PU production at their conversation partner. Even though the interviews are semi-directed, they remain face-to-face spontaneous conversations where participants need to keep eye contact with the addressee to ensure a smooth social interaction.

Looking at the other categories, some are used more than others. This is the case of the floating category, <FL>, for instance. Even within the floating variant that includes upward and downward directions (<FL:UP> and <FL:DOWN>), some participants use all three types of floating gazes (e.g., F004 and S004) while others only perform regular <FL> gazes without ever looking upward or downward during interactive PU production (e.g., C003 and S003). There is even one deaf participant, S001, who never demonstrates floating gaze (<FL>) in the entire set of data for interactive PUS. Linking this finding with the prior results on the type of interactive PUs, it is very interesting to note the total absence of planning PUs in her discourse. Thus, a link between floating gazes accompanying PUs displaying difficulties in processing speech (referred to as the planning function) can be advanced.

Another observation is that participants who have a high tendency of looking at the addressee are those who produce less floating gazes (e.g., speakers: C003, F001, F002

[31] As mentioned, C002 only produced one occurrence of PU in the entire sample. The PU she performed had an expressive function, for which the gaze direction is not reported in Table 11.

and signers: S001, S002, and S003). The same is conversely true: those who have a higher distribution of floating gazes are those who gaze less at the addressee during interactive PU production (especially F004 and S004).

In sum, <FL> gazes are especially performed by BF speakers (except for signer S004, whom also has 25% of his interactive PUs characterized by a floating gaze direction). For instance, two speakers, C004 and F004, who produced a lot of floating eye gazes, closely follow this behavior as well. Perhaps, the same applies to C001 to some extent.

As far as the distribution of <SP> gazes is concerned, there is also a more variable use of this gaze direction. While five participants (three speakers and two signers) display a higher distribution of <SP> gaze directions (over 15%), six others (four speakers and two signers) display lower percentages (less than 10%). This category does not seem to mark a clear-cut distinction in the use of interactive PU among the languages and groups of participants under study.

Lastly, looking at the proportion of <COMPLEX>, viz., when there is at least one shift in gaze direction occurring during the production of interactive PUs, there is a high degree of variability among participants, more so for BF speakers than for LSFB signers. Some speakers stand out from the rest, such as F003, for whom 40% of her gaze categories are characterized by at least one change in direction (see Fig. 46 illustrating gaze shifts from addressed (<AD>) to spatial (<SP>) and back to <AD> at the end of the PU, before the hands go back to the rest position). Other speakers, such as F001 (15%), and C001 (13.5%), also display an important proportion of <COMPLEX> gazes in comparison with the other participants and gaze categories.

Fig. 46: Example of gaze shifts with PU in FRAPé, Task 04, F003 (08:31.985-08:32.886).

To summarize, all participants do not necessarily fall into all categories of the type of gaze direction accompanying interactive PUs, whether they are signers or speakers. This is the case, for instance, of the <SP> category for CorpAGEst speaker C004 who did not use this category at all when performing PUs. The same is true for the category characterizing floating gaze directions (<FL>, <FL:DOWN>, and <FL:UP>), as only a handful of participants made use of <FL:UP> (C001, C004, F001, F003, and F004) and <FL:DOWN> gazes (S004). This last observation is interesting given the possible relation of floating gazes with the particular planning function of PU. One may wonder whether the participants who produce less <FL> PUs are also those who make less PUs with a planning function, and vice versa (this was the case of signer S001).

In other words, the distribution presented above enables the identification of a few emerging tendencies between the three groups of participants (e.g., for <AD>), but there is also a non-negligible degree of intra- and inter-individual variation as regards the type of gaze direction co-occurring with interactive PUs. The results outlined in Table 11 seem to point toward an important degree of idiosyncratic use of gaze directions with PU. However, the results presented only look at the type of gaze direction co-occurring with the entire set of interactive functions of PU, without making any further distinction. Therefore, the following section reports the findings for the kinds of gaze direction that co-occur with specific interactive functions.

6.4.2 Quantitative overview of gaze with PU's [INT] functions

Do gaze directions combine with specific interactive functions of PU? If so, which ones? Are they similar or different between BF speakers and LSFB signers? In this section, I am interested in examining the combinations between PU functions that serve interactive purposes, and specific gaze directions. More specifically, the target of the gaze was analyzed for each functional category of interactive PU. The results are expressed in percentages and based on the major findings discussed in section 6.3. The distribution of gaze directions was calculated for the interactive functions that yielded interesting contrastive results between the two languages for PU in section 6.3. They are as follows: the delivery of new *vs.* shared information, planning, seeking *vs.* showing agreement (monitoring and agreeing), and managing turn-taking. Moreover, only the most frequent double function was taken into account (see (2) in LSFB where S004 combined an interactive with an expressive function).

6.4.2.1 Gazing while delivering new vs. shared information in LSFB and BF

The analyses yielded mixed results. Not all interactive PUs are performed with the gaze directly addressed to the addressee when delivering new or shared information. Only common ground PUs confirm this tendency in LSFB as all COGR PUs are addressed *vs.* 78% in BF (see Table 12). Only a small distribution of floating down gazes (<FL:DOWN>) characterize PUs with a common ground function in BF (6%).

The <SP> category amounts to 16% of all COGR PUs. The same is true for the delivery of new information in both languages, where most PUs are addressed <AD> to the addressee (60% for LSFB *vs.* 48.5% for BF), which makes sense given the fact that when the participant hands over new and/or relevant information to his/her addressee, s/he makes direct eye contact with him/her. The proportion of floating gazes for the delivery function seems to be more characteristic of LSFB (40%) than BF (9%). However, BF speakers seem to resort to a more varied usage of floating gazes, with 6% of <FL:DOWN> and 1.5% of <FL:UP>. It is also possible for this delivery function to be expressed with <SP> (24.5% in BF). A reason for this could be linked to the fact that participants do not look directly at their addressee but rather at a point in space in an attempt not to be interrupted and risk losing the floor.

Funct-C in %	<AD>	<AD:MOD>	<FL>	<FL:DOWN>	<FL:UP>	<SP>	<COMPLEX>
DELIV_LSFB	**60**	**0**	**40**	**0**	**0**	**0**	**0**
DELIV_BF	48,5	0	9	6	1,5	24,5	9
COGR_LSFB	**100**	**0**	**0**	**0**	**0**	**0**	**0**
COGR_BF	78	0	0	6	0	16	0

Table 12: Distribution in percent of gaze directions with DELIV and COGR PUs.

6.4.2.2 Gazing while seeking (MONI) vs. expressing (AGR) agreement in LSFB and BF

The majority of agreeing (76% in LSFB and 67% in BF) and monitoring (82% LSFB and 88% in BF) PUs are characterized by a gaze that is directly addressed to the main addressee in the conversation. Only speakers show a frequent change in the recipient during the course of the eye gaze for the agreeing function (11% in BF *vs.* 4.5% in LSFB), while the same proportion (6%) is found for monitoring in both languages:

Funct-C in %	<AD>	<AD:MOD>	<FL>	<FL:DOWN>	<FL:UP>	<SP>	<COMPLEX>
MONI_LSFB	**82**	**0**	**0**	**0**	**0**	**6**	**6**
MONI_BF	88	0	0	6	0	0	6
AGR_LSFB	**76**	**3**	**3**	**1,5**	**0**	**9**	**4,5**
AGR_BF	67	0	11	0	0	11	11

Table 13: Distribution in percent of gaze directions with MONI and AGR PUs.

6.4.2.3 Gazing while planning in LSFB and BF

An interesting observation concerns planning PUS, for which most of the participants display an eye gaze that lacks direction and has no specific target, viz., floating (59% in LSFB and 37% in BF). Similarly, signers in LSFB also seem to use a floating down and up kind of gaze for this function (25% of <FL:DOWN> and 8% of <FL:UP>). This finding suggests that during the main activity of a word search, the speaker or signer produces a cognitive effort to search for the word and this is translated into a vague gaze. Only 37% of planning gesture gazes in BF are directed at the addressee, suggesting that this 37% is when speakers seek help from the addressee (Fig. 43), while floating gaze directions are used when speakers and signers refocus on themselves to find their words (Fig. 42). Moreover, planning is also the interactive function most frequently associated with a floating gaze direction (<FL:UP> or <FL:DOWN>) in both languages.

Funct-C/ in %	<AD>	<AD:MOD>	<FL>	<FL:DOWN>	<FL:UP>	<SP>	<COMPLEX>
PLAN_LSFB	**0**	**0**	**59**	**25**	**8**	**8**	**0**
PLAN_BF	37	0	37	6,5	0	6,5	13

Table 14: Distribution in percent of gaze directions with PLAN PUs.

Fig. 47: <FL:DOWN> on PU in LSFB, Task 04, S004 (6:24.433-25.505).

Fig. 48: <FL:UP> on PU in LSFB, Task 18, S002 (4:25:983-26:421).

6.4.2.4 Gazing while managing turn-at-talk in LSFB and BF

A difference that stood out when observing the interactive specificities of PU in the discourse of signers and speakers was that signers used PU to regulate their turn more often than speakers did. It seems therefore interesting to observe the kinds of gaze directions that characterize such PUS that regulate turn-at-talk in signers' and speakers' discourse. Are they the same when signers and speakers open, give, or close their turn?

Turn-opening PUs displayed more variability in their distribution than might have first been expected. It could have been hypothesized that when initiating a speaking/signing turn, the participant would look at the other person in the conversation in order to show who is taking over. However, the results displayed in Table 10 do not concur with this assumption. While it remains true that most turn-opening PUs are accompanied by a direct gaze at the addressee, especially in LSFB (57% *vs.* 17% in BF), the rest of the gaze values are much more dispersed. This holds true for BF speakers, for whom 17% are <FL> gazes and 33% of them are <SP>, compared to 29% in LSFB for that category. Interestingly, speakers are much more apt to change their target during turn-opening PUs than signers (33% *vs.* 0% in LSFB). Looking at turn-closing PUs, the same kind of information is found except for the fact that half of such PUs in BF are directed at the addressee (*vs.* 30% in LSFB), which is the opposite of the turn-opening function. In other words, speakers look more at the addressee when closing a turn than when opening one, and the other way around for signers. This finding relates to Kendon's (1967) study. Only signers used PU to hand over the turn to the addressee. Therefore, it is not surprising to observe that 96% of turn-giving PUs in LSFB are addressed to the addressee given that handing over the floor is usually accompanied by an <AD> to indicate that the other party can take over. Lastly, the double function combining attitude and turn-closing is expressed with a range of gaze directions. In LSFB, <SP> and addressed <AD> or <AD:MOD> gazes are more prominent. <AD> gazes in BF represent half of the gaze types (50%) when expressing this function. There are also floating gazes characterizing this function in both languages, but this is especially true for speakers, and even more so for the <FL:DOWN> category, with 33%.

Funct-C in %	<AD>	<AD:MOD>	<FL>	<FL:DOWN>	<FL:UP>	<SP>	<COMPLEX>
TURNOPEN_LSFB	**57**	**14**	**0**	**0**	**0**	**29**	**0**
TURNOPEN_BF	17	0	17	0	0	33	33
TURNCLOSE_LSFB	**30**	**10**	**10**	**2,5**	**2,5**	**45**	**0**
TURNCLOSE_BF	50	0	0	0	0	0	50
TURNGIVE_LSFB	**96**	**0**	**0**	**0**	**0**	**0**	**4**
ATT+TURN _LSFB	**13**	**13**	**13**	**7**	**0**	**40**	**7**
ATT+TURN_BF	50	0	17	33	0	0	0

Table 15: Distribution in percent of gaze directions related to TURN-TAKING PUs.

6.4.3 Summary of accompanying gaze directions

This section set out to demonstrate two things: (1) how signers and speakers organize their gaze when they produce interactive PUs, and (2) whether specific gaze directions tend to co-occur with specific interactive functions. The analyses yielded interesting results that shed light on a certain affinity between gaze direction and interactive PUs.

The types of gaze directions characterizing interactive PUs in LSFB and BF highlighted a certain degree of consistency between both languages, with more than half of all interactive PUs performed with direct addressed gazes (54% of <AD> in BF and 60% in LSFB). The same holds true for <SP> gazes, with 16% in BF and 17% in LSFB. Floating gazes, including downward and upward variants, were more characteristic of LSFB signers than speakers (12% of <FL> in BF *vs.* 9% in LSFB; 1% of <FL:UP> in LSFB *vs.* 0.5% in BF, and 7% of <FL:DOWN> in BF *vs.* 3% in LSFB, as displayed in Fig. 44). As far as gaze shifts are concerned, speakers appeared to change gaze targets more often than signers (10% in BF *vs.* 3% in LSFB). The results by corpus also revealed a stable usage for certain categories such as <AD> and <SP>, as well as floating gazes (see Fig. 45). However, there were proportionally twice as many <FL:DOWN> gaze types in CorpAGEst than in the other BF dataset, and almost four times as many than in the LSFB Corpus. Moreover, it was FRAPé speakers who made the most changes in their gaze direction during the articulation of interactive PUs (11%). The results obtained for each participant (see Table 11) revealed that they do not all necessarily fall into all categories of gaze direction that accompany PUs, whether they are signers or speakers. Rather, there seems to be an important idiosyncratic use of the different gaze categories co-occurring with interactive PUs.

Now, looking at the kinds of interactive functions expressed with specific gaze directions as displayed in section 6.4.2, it is noted that, although differing in their respective distributions, most delivering, common ground, agreeing, and monitoring PUs are accompanied by an eye gaze toward the addressee in BF and in LSFB. Only planning PUs in BF show <AD> gazes as well. Floating gazes otherwise characterize planning PUs. Not all functions managing turn-at-talk (especially opening and closing one's turn) are accompanied by an <AD> gaze. The only exception is when the primary speaker/signer is giving the turn to his/her addressee.

7 Preliminary Conclusions

This chapter set out to investigate the interactive functions of PU as used by LSFB signers and BF speakers. To this end, various aspects were investigated: PU's distribution, functions in discourse and in social interaction, as well as its association with gaze directions. The analyses yielded compelling quantitative and qualitative results. They are summarized below.

First, LSFB signers produced more PUs/100 signs than BF speakers. When breaking down the number of PUs in each corpus, however, this difference faded away as the statistically significant difference lay between LSFB signers and CorpAGEst speakers only. Thus, from observing the data, language itself does not constitute a determining factor to distinguish PU production between signers and speakers. Moreover, a more heterogeneous picture emerged when looking at the distribution by participant. For some, such as signer S004 or speaker F004, there was a clear preference to use PU, while others almost completely failed to produce any at all (e.g., C002). Some results even showed that some speakers (F004) exhibited behavior close to that of some signers (Fig. 29). This heterogeneous picture of PU could partially be explained by the participants' personalities (Hostetter & Potthoff, 2012), as well as other situational factors, including the linguistic context and the communicative situation itself (e.g., sitting on a chair with arms or holding objects) (McKee & Wallingford, 2011). As pointed out by Gabarró-López (2017), "this finding nuances Kendon's (2004) claim about PU being highly conventionalized among speakers [and signers]. Indeed, speakers and signers use it, but some intra- and inter-language" (p. 26) variations are notable.

Second, PU's discourse functions in LSFB and BF are interactive and expressive. Speakers, however, used more PUs from the ideational and structuring domains than signers, while signers used twice as many double functions combining [EXPR+INT] as speakers. Only a statistically significant difference was observed for PU's interactive function between CorpAGEst and LSFB participants ($p = 0.020$), where signers used more [INT] PUs than speakers, but such a difference could not be further established either between the other groups or for the other main discourse functions.

These results echo previous work on other SLs and SpLs. Gabarró-López (2017, 2020) in a study on PU in LSFB (and LSC) found that PU's two most frequent functions were those that regulate interaction and express modality. The same has been noted for NGT (van Loon, 2012) and NZSL (McKee & Wallingford, 2015). Similar functional outcomes were found for SpLs as well (see Bavelas et al., 1995; Holler & Bavelas, 2017; Kendon, 2004). No clear-cut distinction, based either on PU's distribution or main discourse functions, could be found to distinguish PU's use between both languages.

Third, when splitting up the interactive domain according to its respective functions within the social context, quantitative results painted a contrastive picture. First, LSFB and FRAPé individuals used the same range of interactive functions (10 and 9 out of 13, respectively) while CorpAGEst speakers used a more limited set (seven out of 13). Thus, the same kinds of interactive functions – although different in frequency – were found in the two datasets recorded from the gathered participants under the same methodology, while a more limited range was found in CorpAGEst participants. The hypothesis is that the nature of the dialogue itself (Bavelas et al., 1995) plays a role on the nature of the interactive gestures. Nonetheless, differences were also noted. First, the three most frequent functions in BF constitute the three least frequent ones in LSFB (planning, delivery, and common ground), but some interactive functions are specific to spoken discourse, which is the case for the delivery of new information through PU. It occurred much more in BF (36% in FRAPé and 25% in CorpAGEst *vs.* 2% in LSFB). These PUs in SpLs have been described as "metaphorically presenting the topic of discourse" (Müller, 2018, p. 6).

One of the reasons for that could be that speakers can use PU as a supporting device to what they express concurrently in their speech. Indeed, they can rely on their vocal tract to deliver information while simultaneously supporting the vocal information with PU, while signers are limited in that sense. By contrast, signers resort to PU for other interactive purposes, including agreeing and turn-taking. The former was used in 28.2% of PU-related interactions in LSFB *vs.* only 6% in FRAPé, and none in CorpAGEst. Such PUs were mainly used as backchannels in LSFB, possibly because of the preference for other kinds of backchannelling expressions – other than PU – by speakers, including vocal cues such as "mm" or other spoken responses and vocal strategies like laughter (e.g., Depperman, 2013). These expressions, nevertheless, await further comparative work.

Furthermore, signers used PU to regulate turn-taking, especially for closing, giving and opening, which represented 36.2% of PU's interactive purposes in LSFB, while speakers did so much less frequently (only 4% of opening and closing PUs in FRAPé, and only 2% in CorpAGEst). This finding can be interpreted in the light of van Loon et al.'s (2014) suggestion regarding the grammaticalization path of PU into SLs. According to these researchers, PU first entered the language as a general turn-taking marker, which may have been facilitated by "the fact that palm-up can only be integrated sequentially into a string of signs" (2014, p. 2139). This may explain why signers in the data mainly use PU as a turn-taking strategy while speakers do not.

Another atypical finding that was not linked to language for the participants recorded in this study was the use of PU as a marker of common ground (COGR). Both signers and speakers regulated their behavior as part of the conversational construction through COGR but there was an important divide between corpora. COGR was the most frequent function in CorpAGEst (32%), the third in FRAPé (15%) and among the least frequent ones in LSFB (1.3%). Even in BF, there were twice more COGR PUs in CorpAGEst than in FRAPé, which could be explained by the fact that dyads in CorpAGEst belonged to the same family circle, suggesting that family members share more personal COGR. All of these results concerning the most frequent interactive functions in each corpus are summarized in a table in the appendix, along with the other two gestural markers, the IFE-G and holds.

Lastly, gaze direction was analyzed in relation to PU with the twofold aim of examining gaze direction types co-occurring with interactive PU, on the one hand, and the possible associations between special kinds of gaze directions with specific interactive functions, on the other. The findings for the first part highlighted a fairly well-distributed picture of the different gaze directions, especially for addressed gazes (<AD>), as well as floating gazes (<FL>), and non-addressed gazes directed at a point in space (<SP>). Floating variants, including upward and downward directions, as well as changes taking place during PU production, were more frequently present in BF than LSFB. The distribution presented by corpus showed a few emerging tendencies between the three groups of participants (e.g., for <AD>), but with a non-negligible degree of intra- and inter-individual variation as regards the type of gaze direction co-occurring with interactive PUs. The results revealed a degree of idiosyncratic use of gaze directions with PU. However, the results presented only looked at the type of gaze direction co-occurring with the entire set of interactive functions of PU, without making any further distinction. In contrast, results for the second part showed that when delivering new information, not all gaze directions were addressed to the addressee. There was also a good proportion of floating gazes in LSFB (40% of <FL> only *vs.* 9% in BF). Only floating downward as well as upward gazes were present in BF (6% *vs.* 1.5%, respectively). Conversely, addressed gazes in both languages mainly marked common ground PUs. The same holds true for PUs seeking and expressing agreement (viz., monitoring and agreeing). Planning was primarily expressed with floating kinds of gazes, but addressed gazes did occur in BF in 37% of cases. As far as turn-taking PUs are concerned, there was a more varied use of gaze, except for the function of giving the turn to the addressee, for which 96% of such PUs were combined with an addressed gaze <AD>.

These results revealed an interesting contrastive picture on the use of eye gaze with interactive PUs in LSFB and BF. Yet, they need to be construed with caution given the lack of a state-of-the-art eye tracking device within the present study as well as the limited number of participants. Nevertheless, this additional non-manual resource highlighted the fact that PUs and other behaviors combine and interact with one another to create meaningful messages within the flow of interaction. The interrelations between these different aspects and the specific functions they serve in the interactional process await more systematic research.

CHAPTER 4
Getting to the Point
TOWARD AN INTEGRATED APPROACH TO INDEX FINGER-EXTENDED GESTURES IN LSFB AND BF INTERACTIONS

Language does not happen solely in the mind of a speaker,
but it is used to act and react out in the world
(Ferrara, under rev., p. 36)

Widespread in everyday interactions, the extension of one's body part in the direction of a present or absent referent such as an object, direction, location, or person is conspicuous. This phenomenon has been referred to as "pointing". Pointing has been described as one of the foundational building blocks of human communication (Kita, 2003) in both ontogeny and phylogeny, and has been assumed to be one candidate for a human universal in language (although cultural specificities emerge in how individuals point, see Cooperrider et al., 2014; Wilkins, 2003). The simple act of pointing has received a lot of attention from researchers in both SL and gesture studies. Yet, research analyzing pointing from a cross-linguistic and interactional perspective in spoken and signed languages is still lacking.

This chapter describes what is included as index pointing signs in SLs and index pointing gestures in SpLs from a different angle than that which scholars usually take in the scientific community. In the present study, the term "Index Finger-Extended Gesture" (IFE-G) will be used, a motivated choice explained in the continuity of this chapter. More specifically, the following sections are structured as follows. After providing some rationale as to why tackling pointing is essential to the study of language in section 1, I will define the term adopted in this dissertation in more detail (section 2). Then, I will review some major works on pointing in the fields of SL and SpL research (sections 3 and 4, respectively). Section 5 will introduce the steps undertaken to identify this phenomenon in LSFB and BF data. Lastly, the results will be reported in section 6. Overall frequencies and discourse functions will be provided, followed by a qualitative discussion of examples drawn from the BF and LSFB datasets.

1 Getting to the Point: Rationale

Two main questions guided the inclusion of index pointing[32] in the range of the manual forms analyzed in the present framework. Firstly, why is it still illuminating to conduct research on pointing? Secondly, why compare pointing gestures and pointing signs together? As will become clear in the next part, pointing has acquired a certain status over the years among SL as well as gesture researchers.

First, drawing on the words of Kita, pointing has been described as an essential building block of human communication (2003, p. 1) and by Enfield and colleagues as an exclusive "human mode of joint-attentional behavior" (2007, p. 1723). Additionally, this bodily act is inevitable when people interact with each other. Speakers (and signers) systematically and constantly use pointing to refer to referents in their discourse during all sorts of everyday activities (Clark, 1996). Referents can be a present or absent entity, object, location, even direction, and pointing may come in many different forms and shapes depending on its functions (Versante & Kendon, 2003). Furthermore, pointing is a human characteristic that is unique as animals do not point (at least, not in their natural habitat). It is thus a fundamentally human tool, which sets individuals apart from the rest of the animal reign, just as language does. Although often argued as a prevalent phylogenetic precursor to language (e.g., Hewes, 1996; Rolfe, 1996), pointing remains essential in ontogeny. Children use index pointing even before they can utter their first words, and they will later combine pointing with words. Moreover, how infants make use of pointing paves the way for future language developments as well (Butcher & Goldin-Meadow, 2000; Morgenstern, 2014; Tomassello et al., 2007). These claims combined together have put index finger pointing on the list as a candidate for a human universal (but see Wilkins, 2003, for counter arguments on "why pointing with the index finger is not a universal in sociocultural and semiotic terms" (p.171)). Another fundamental reason is that pointing also forms part of the grammar of SLs. This last aspect is one of the reasons why it is even more intriguing to look at pointing in the current study.

Still, beyond all these reasons, why is it crucial to compare this phenomenon in SL and SpL? It is a fact that index pointing is widely spread across speaking and signing communities. In addition, it carries the same broad function of drawing attention to locations or entities (Fenlon et al., 2019) and displays some similarities when looking at its formal aspect (Barberà Altimira & Zwets, 2013). As such, the first impression might be one of simplicity. Nevertheless, the situation is less straightforward than that. In fact, touching upon the notion of pointing in SLs inevitably brings to the fore the challenging task of discussing what has been assigned as part of a linguistic system, viz., the grammar of the language, *vs.* what is supposedly not part of a linguistic system in SpLs and has been described as gestural. The next subsection introduces this debate about the gesture-sign paradigm as to pointing.

Then, why compare index forms in SL and SpL interactions? As thoroughly presented in the theoretical part of this dissertation (see Chap. 1, section 3.1), there is a raw distinction characterizing world languages between signs of SLs seen as properly part of the linguistic structure of the language, on the one hand, and gestures in SpLs

[32] There will be a transition as regards the terminology employed in this chapter. First, to concur with what the literature has been using, the term "pointing" or "index pointing" will be used to refer to 1-handshape manual forms. Then, as the analysis moves forward, a more neutral term will be used and the motivation behind this decision will be laid out.

not being seen as part of the linguistic system proper, on the other. Such a distinction applies and has been applied to pointing. Gestural points in the field of SpL gesture research have been ascribed "as instances of non-verbal communication that can be used concurrently with, or instead of, speech" (Fenlon et al., 2019, p. 2) but not as a comparable linguistic phenomenon forming part of the language structure as pointing signs in SL research have. Since theoretical frameworks of sign and gesture have evolved independently from each other, it does not come as a surprise that both pointing gestures and pointing signs are considered fundamentally distinct. Yet, this formal resemblance of the characteristic index shape linking pointing signs of SLs and pointing gestures of SpLs is still present. This is no accident, as pointed out by Fenlon and colleagues (2019). A case in point is that studies conducted on ASL and BSL, and their SpL counterparts, have reported that in western cultures people point to themselves with the index finger extended to their chest, while in Japan, for instance, self-pointing is done by pointing to one's nose in both spoken Japanese and Japanese SL (McBurney, 2002). Although the integration of gestural phenomena (e.g., PU, headshakes, and pointing gestures) into the structure of SL systems through the process of grammaticalization is not the focus of the current research, another important aspect to consider is that pointing gestures in SpLs may become a source for pointing signs in SLs. This has been proposed by Pfau and Steinbach (2006) who demonstrated that pointing gestures performed by speakers may over time become integrated into SL systems and become locative signs, then demonstratives, and lastly, personal pronominal pointing signs (but see Cormier et al., 2013, for an interesting comparison of speakers and signers' points).

Hence, this straightforward dividing line has made it difficult for researchers to unravel this phenomenon that occurs in both languages. As a result, it would be tempting to jump to conclusions by arguing that what occur in SLs are signs, and therefore linguistic, and that what take place in SpLs are gestures, and thus para-linguistic, as highlighted by Barberà Altimira and Zwets (2013). As argued in this doctoral dissertation, this clear-cut distinction characterizing the fields of SL and gesture research is too narrow and simplistic. The picture is much more complex than this initial division accounts for (see Chap. 1, section 3.2.2 on the impact of gesture's definition). It is therefore argued in the present study that the index forms occurring in LSFB and those articulated in BF may fulfill similar discourse functions when considered at the interactive level of language, viz., as part of the interactional practices deployed by speakers and signers to express a range of meanings related to the management of social interaction, not limited to referential content only.

It can thus be said that the historical background of SL and gesture research along with the various theoretical frameworks, partly explain why researchers have dealt with pointing distinctly in both fields, and have developed strikingly different arguments as regards the extent to which pointing signs form a category apart from pointing gestures in SpLs. Moreover, another issue when looking at pointing is that scholars who have actually analyzed pointing gestures and signs hand in hand lacked empirical data. Another problem to deal with when comparing a similar manual behavior in both types of language is that studies on pointing adopt different approaches, as summarized by Barberà Altimira and Zwets (2013):

> The problem for comparing pointing signs and pointing gestures is that these analyses work on different levels: for co-speech gestures, research mainly focuses

> on a semantic pragmatic level […], while for pointing signs the focus has been more on the phonological and morphosyntactic level (p. 435)

There is therefore a need to apply a common analytical framework that suggests reconciling pointing signs and pointing gestures, while at the same time drawing on comparable and empirical data. This gap is what motivates the present research in the sense that it seeks to address the issue of pointing by directly comparing spontaneous and naturally occurring index pointing signs in LSFB signers with BF speakers' pointing gestures in dyadic conversations. The forthcoming analyses, therefore, fall within the framework formulated by researchers including Ferrara (under rev.) to address the issue of pointing adopting a comparative semiotic approach (Enfield, 2009; Johnston, 2013a) by contrasting index pointing signs in SL data with index pointing gestures in SpL data in order to fully ground pointing in language theory. Not only a language theory that reflects and focuses on the referential functions of index pointing in spoken and signed languages, but a language theory that incorporates into its framework the "interplay between different types of semiosis (description, depiction, indexicality) in an inclusive, systematic way" (Ferrara, under rev., p. 1).

In other words, the interest here goes beyond pointing's role as a precursor to language or as part of the grammatical systems of languages (viz., as pronouns). Indeed, beyond this proto-linguistic and grammatical status, pointing keeps invading people's lives and day-to-day interactions. As individuals grow up and language is acquired, pointing never disappears. Speakers and signers of all languages continue to point "as a key tool for achieving joint attention and constructing utterances" (Enfield, 2009, p. 91). This chapter analyzes all forms that displayed a protruding index in the discourse of LSFB signers and BF speakers during naturally occurring conversational interactions (in the sense of not experimental). It is argued that the IFE-Gs in LSFB and those in BF can carry other discourse functions than the ones assumed in language theory up to now, viz., referential. The question is: do IFE-Gs fulfill similar or different semantic-pragmatic discourse functions in spoken *vs.* signed interaction in Belgium?

To my knowledge, no other work analyzing directly comparable data of pointing gestures and pointing signs on the same level, from an interactional perspective, to assess and quantify the differences and/or similarities between the two has been conducted thus far. The only exception is Ferrara (under rev.), who focused on the interactional functions of pointing actions in NTS. Her study is based on Bavelas and colleagues' (1992, 1995) functional typology developed *a priori* for SpL phenomena of interactive gestures, the findings of which are summarized in section 3 of this chapter.

All of the above-mentioned reasons suggest *a priori* that pointing may appear to be a trivial phenomenon at first glance, as one of the "simplest, most primitive form[s] of communicative action" (Enfield, 2009, p. 90). Yet, it represents a challenging and critical case for scholars interested in the study of SL and gestural aspects of language. The following section sheds light on the phenomenon investigated in this study by providing a clear definition of what is meant by the IFE-G.

2 Terminology and Definition

Before reviewing the literature on pointing, it is useful to look at the phenomenon under scrutiny, adopting a form- and function-based approach to its description. Manual pointing has been described in SpLs and SLs with the following formational characteristics: handshape, handedness (one- *vs.* two-handed points), hand preference (right *vs.* left), duration, and chest contact. As regards its main functions, indicating referentiality seems the most common one (Johnston, 2013a, 2013b), but interactive uses of pointing have begun to emerge within the literature on SpLs and SLs as well (Ferrara, under rev.; Jokinen, 2010; Mondada, 2007, 2014). These formal and functional characteristics are introduced below.

What are the characteristics of prototypical manual pointing signs and gestures at the level of form? Firstly, looking at the handshape, it might seem that there is not a single unique form that shapes pointing but a myriad of possibilities, which are culture specific (see section 4 of this chapter). Nevertheless, it is possible to identify a few characteristics of the canonical manual pointing handshape. Usually in SLs, pointing signs are described as displaying conventionalized handshapes. For instance, a protruding index finger extended for personal pronominal use has been reported for western SLs, such as BSL and ASL (Sandler & Lillo-Martin, 2006), while possessive pronominal use is more often expressed with a B-handshape in ASL and a closed fist in BSL (Fenlon et al., 2019, p. 2). However, within pronominal pointing signs, the index finger is not always the favorite candidate. In a corpus-based study of ASL, Bayley and colleagues (2002) examined pronominal pointing. Their findings suggest that first-person pronouns displayed more variation in their handshapes (81% of ASL signers did not resort to the index finger) than third- (45%) and second-person pronouns (34%). Fenlon and colleagues (2013) found a similar tendency for BSL.

According to SpL research, pointing gestures are most often articulated with an index-finger handshape. This holds particularly true for western cultures (Anglophone and European) (Cooperrider et al., 2018). As mentioned in this chapter's introduction, index pointing has often been presented as a perfect candidate for a human universal, (but the use of the index in other parts of the world is not often selected for pointing expressions (Cooperrider & Núñez, 2012; Wilkins, 2003). For example, Wilkins (2003) demonstrates that in a central Australian community, speakers of Arrernte display three types of pointing involving three different body parts, namely, the hand, the mouth, and the eyes. Thus, Wilkins concludes that the mere act of pointing may be universal, but index pointing is not. Rather, it is "subject to cross-cultural variation along a number of semiotic parameters" (p. 212). In addition, other researchers have pointed out that different handshapes can be used to express specific kinds of discourse functions (e.g., Versante & Kendon, 2003). Flack and colleagues (2018) observe how target visibility affects the kind of pointing performed by passersby to provide directions. Interestingly, they find that when people are pointing at visible targets, they make use of the index. However, when the landmark is out of sight, the participants first point with an index but then elaborate upon this initial gesture with a pointing gesture using the entire hand. Thus, even in a cultural context where the index has been described as the predominant form of pointing, other contextual aspects affecting the situational circumstances can shape pointing differently.

Secondly, do speakers and signers produce one- or two-handed points? Although two-handed pointing is found in some SLs (e.g., Auslan, Johnston, 2013a, 2013b), one-handed points are usually more frequent. Similarly, the canonical pointing gestures are most often articulated with one hand rather than two, although two-handed forms have also been acknowledged (Cooperrider, 2014). In the present study, two-handed finger points have been found for both BF and LSFB (see Figs. 49 and 50 below).

The third related formational aspect of pointing is hand preference. In SLs, signers can use their right and left hands to different degrees. Hand preference is well documented in SL linguistics, for which a distinction is made between the dominant hand, that is, the hand most frequently activated, and the non-dominant one. Johnston (2013a) finds in his study on pointing in Auslan that up to 90% of pointing signs are produced with the dominant hand. However, in a recent study, Ferrara (under rev.) explains that signers can also produce pointing signs with their subordinate hand, independently of the dominant hand, to convey interactional meanings. In gesture studies, some researchers have attested a link between hand preference and the execution of gestures (Enfield et al., 2007).

Lastly, the duration of points has also drawn the attention of some researchers (Fenlon et al., 2019). In SL research, pointing signs have been reported to be shorter in duration than lexical signs (e.g., STS, Börstell et al., 2016). Furthermore, self-pointing signs in Auslan (Johnston, 2013b) have been found to be shorter than any other kind of pointing signs. In SpL research on gesture, there is no consistent finding for the duration of pointing gestures, except for "considerable variability in their length" (Fenlon et al., 2019, p. 6).

To provide a comprehensive overview of index pointing, the following figures illustrate canonical cases with the formational features mentioned above (regardless of the function in both languages). The examples[33] are drawn from the three multimodal corpora used in this dissertation. LSFB examples are on the left while the corresponding examples in BF are on the right.

vs.

Fig. 49: Self-directed points in LSFB and BF, respectively.

vs.

Fig. 50: Addressee-directed points in LSFB and BF, respectively.

[33] From left to right, **self-directed points** are from the LSFB Corpus (Task 15, 00:39.190-449 and 00:00.808-01.543 by S002, respectively) and the FRAPé Corpus (Task 20, 06:00.529-01.123 by F004 and Task 04, 1:34.383-1:34.960 by F001). **Addressee-directed points** from the LSFB Corpus (Task 04, 2:26.590-2:26.853 and Task 15, 09:28.722-796 by S001), CorpAGEst (S3, 04:12.002-04:12.883 by C004) and FRAPé (Task 03, 04:43.248-43.882 by F001). **Other-directed points** (e.g., concrete or abstract referent other than the current speaker/signer or addressee) are from LSFB (Task 18, 02:30.640-02:31.094 by S002) and CorpAGEst (S3, 1:19.423-1:20.112 by C004).

Fig. 51: Other-directed points in LSFB and BF, respectively.

Based on the above-mentioned presentation of canonical pointing in gesture and SL according to specific formational features, the following questions are raised: what is the object of study and why is it not referred to as "pointing" in the current dissertation? The main reasons for a distinct terminology are outlined below.

What do I mean by "Index Finger-Extended Gestures"? First of all, at the very beginning of this dissertation, the goal was to find comparable manual forms that occurred in both spoken and signed languages, and that could serve as a basis for a strong comparable and systematic analysis of their roles and uses across the two modalities and languages. Therefore, I had to find common ground as regards the choice of the various manual forms and a neutral terminology to refer to those forms in the two languages. By using this term rather than "pointing", I could respect the goal established initially. At first glance, the IFE-G was chosen as a candidate because of its formational aspect occurring in SpL and SL, and, second, because it had been reported in previous work as a strategy used in the regulation of social interaction.

Second, the analytical lens in this research project is to begin with identifying a manual form based on its formational characteristics first, and then its functional aspect (see Chap. 2, section 3.3.4). By choosing the term "IFE-G", I am not referring to the functions lying behind the index shape. Referring to this form as "pointing gestures" or "pointing signs" subsumes the function it has, especially in SL linguistics where pointing is primarily associated with pronouns. Moreover, pointing is not only executed with the index finger. Rather, the act of pointing includes all sorts of bodily conducts, for which the hand(s) and/or finger(s) are not the primary articulators used (e.g., lip pointing, Enfield, 2001). To corroborate this claim, interesting work conducted by Coopperrider and colleagues (2014) as well as Coopperrider and Nuñez (2012) on a group of Yupno speakers in Papua New Guinea sheds light on this issue. The authors showed that Yupno speakers used nose-pointing gestures, which are characterized by "contractions of the muscles surrounding the nose along with muscles of the brow while re-orienting the head toward a region of space" (Cooperrider et al., 2014, p. 356). It appears as relevant to specify the primary formational aspect of the form analyzed in this study, viz., the 1-handshape, as represented by the index finger extended.

Furthermore, what are called "pointing signs" in SL have been described as part and parcel of the grammar of the language with a primary pronominal function, locative, and determinative functions. Additionally, what are referred to as "pointing gestures" in SpL often belong to the gesture category known as "deictic" (McNeill, 1992), highlighting a major referential function in discourse. Yet, the present goal is to go beyond the referential function of "pointing" by investigating the other uses of such gestures in conversation. To do that, it is important not only to pinpoint the forms labeled as "canonical pointing" in the data, but also to look for and identify other forms of bodily behavior that have an index extended as their primary feature but are not used as prototypical pointing gestures or signs (see section 5 of this chapter). Choosing one term over the other has to do with meeting the objectives set out in this dissertation, that is, the study of the interactive functions of a set of common formational gestures in two kinds of languages, spoken and signed, toward a more integrated view of pointing gestures in spoken and SL interactions.

As seen in the previous section, pointing has drawn the attention of many scholars in the linguistic field. Some of the major works devoted to its description and functioning are presented in the following sections. As most studies tackle and refer to the IFE-G as "pointing", the term "pointing" will be used in the following literature overview. However, after that, "IFE-G" will be used as a term that encompasses not only pointing actions but also other gestural forms of bodily behaviors that display an index handshape. In the following sections, work that has been conducted on manual pointing signs in SLs is presented first, and then research on manual pointing gestures in SLs is reviewed.

3 IFE-G in Signed Languages

Pointing has been the object of a large spectrum of studies of SLs. It has been ascribed different functions in SLs, among which one of the most frequent is the corresponding equivalent of pronouns in SpLs. Indeed, several studies have analyzed pointing signs as the equivalent of pronouns found in SpLs (e.g., Klima & Bellugi, 1979; Sandler & Lillo-Martin, 2006; Meier & Lillo-Martin, 2010). Yet, although pointing gestures tend to co-occur with pronouns in SpLs, they are not themselves categorized as pronouns (Fenlon et al., 2019). A case in point illustrating this perspective is Johnston's (2013a) study on the formational and functional components of pointing signs in Auslan. Adopting a corpus-based approach to SL data, Johnston argues against a view that analyzes referential pointing as part of the grammatical class of pronouns. Instead, he demonstrates that pointing signs in Auslan are blends of linguistic and gestural material, as Liddell (2000) first suggested[34].

Nevertheless, other scholars have emphasized that pointing signs found in SLs do not only share some common ground with pronouns found in SpLs but they also resemble pointing gestures non-signers produce. For instance, Cormier et al. (2013), focusing on the similarities, examined pronominal pointing signs in SLs with (a) corresponding personal pronouns found in SpLs and (b) pointing gestures as used by speakers, in order to determine whether signers actually made use of personal pronouns or whether they resorted to pointing gestures (similar to those produced by non-signers). Based on their results, Cormier and colleagues came to the conclusion that "it can neither be argued that pronominal signs are unproblematically equivalent to personal pronouns nor that they are identical to pointing gestures, because closer examination reveals that they share features of both" (2013, p. 231).

SL linguists have not only focused on the pronominal roles of pointing signs. Zwets (2014), for instance, compared pointing in NGT against pointing gestures in Dutch speakers. She found that NGT signers were more likely to point to arbitrary positions in space to refer to absent referents than Dutch speakers were with gestures. Mesh (2017) also conducted a study on locative points performed by speakers and signers in

[34] It is beyond the scope of the present study, and not our current intention or our goal to comprehensively discuss the arguments regarding whether the grammatical status ascribed to pointing as a legitimate member of the pronoun class in SLs exists or not (see the papers mentioned in the text above for more detailed information).

San Juan Quiahije Chatino (a town located in southwestern Mexico). She also found that participants selected different handshapes for different targets. Thus, hand pointing can display locative functions and determinative ones to specify a referent as given or known in addition to their referential roles, as corroborated by Johnston's (2013a) study on pointing in Auslan (but see Engberg-Pedersen, 2003, for a relevant discussion).

As a result, the line between pointing in sign and gesture is complicated and too often blurred, but several authors have put forward the need for linguists to address pointing comparably in sign and gesture in order to fully account for pointing as part of language theory (a few examples are Cormier et al., 2013; Johnston, 2013a, 2013b; and Ferrara, under rev.). Nevertheless, most studies fail to directly address pointing signs and pointing gestures with comparable and empirical data. As a response to this need, Fenlon and colleagues (2019) recently published a study directly comparing pointing in spoken and signed language data. The authors provide a direct empirical comparison of pointing gestures in spoken American English with pointing signs as produced by BSL users, and focus on how sign and gesture points differ as to certain formational aspects according to three main changes affecting a linguistic system over time: conventionalization, reduction, and integration.

To test this claim, they looked into three kinds of pointing, namely, self-, addressee-, and other-entity points. Following Johnston (2013a), they further analyzed each type according to: handshape, one- *vs.* two-handed points, hand dominance (right *vs.* left), duration, and chest contact. The authors hypothesize that pointing signs are constrained differently than pointing gestures according to these formational aspects. Their findings support this claim. They found that BSL pointing signs are indeed "more consistent across uses, more reduced, and more integrated into the prosodic structure than pointing gestures" performed by non-signers (Fenlon et al., 2019, p. 21). They conclude that pointing in SLs differs fundamentally from pointing gestures in SpLs based on these formational aspects. Possible explanations accounting for this might be that pointing signs have experienced changes related to linguistic systems such as grammaticalization, and that they are performed with the same body parts, viz., the hands, as the other signs accompanying pointing, while this is not the case for co-speech gestures. In light of these results, the authors still present their finding with caution and call for more research.

While the above-mentioned studies tackle the issue of pointing in various SLs, and increasingly include directly comparable and empirical data of pointing gestures occurring in SpLs, there is still a lack of research devoted to the examination of pointing beyond its referential functions, that is, within the context of social interaction. A few notable and early attempts at showing another side of pointing roles in SLs, though, are Baker (1977) and Van Herreweghe (2002) who worked on turn-taking in ASL and VGT, respectively. Baker found that "manual indexing" could be used as a marker of turn management as well as a way to provide feedback. Van Herreweghe's results suggested that Flemish signers could also resort to pointing for managing turn-taking but the different situations in which signers were put yielded different results depending on the type of meeting: all-signs *vs.* mixed (viz., with one or two sign language interpreters). While both of these earlier studies unveiled a number of new emerging roles of pointing as part of interactional practices, they only did so in passing. The interactive dimension of pointing has been the object of little attention. Moreover, this type of research usually fails to be adequately situated within the larger literature.

A recent exception to this, though, is Ferrara's (under rev.) study on finger pointing actions in naturally occurring NTS conversations. Her paper is the only one hitherto to investigate the interactional meanings of pointing signs, arguing for their integration into language theory. Primarily based on Bavelas et al.'s (1992) typology of interactive gestures, she conducted a corpus-based study on 11 informal conversations in NTS. Out of the 21,265 manual sign tokens produced by 21 deaf signers (15 women and 6 men), 4,172 were identified as pointing signs (representing almost 20% of all manual sign tokens). This finding resonates with Engberg-Pedersen's (2003) claim that "almost every fourth sign in signed discourse is a pointing sign" (p. 271). While Ferrara's results concur with previous studies on the predominant referential functions of points (53.4%), there is, nevertheless, a smaller set of pointing signs (8%) performing interactive functions, which appeared as the fourth most frequent function of index pointing in NTS. Therefore, her study provides a strong foundation to consider the relevance of pointing actions not just for the referential work they do, but also for the interactional usage pointing actions exhibit in the regulation of conversations led by signers.

The forthcoming study falls within this exact framework, while at the same time adding index pointing gestures as a point of direct empirical comparison.

4 IFE-G in Spoken Languages

Pointing gestures have not received did not receive the same scholarly attention as pointing signs in SLs regarding the linguistic status ascribed to this manual form. Still, pointing remains a hallmark in the field of gesture studies. It has been approached in a wide array of contexts and from many perspectives across various language and cultural communities (Kita, 2003). The main question framing this section tackles how pointing has been reported in SpL research.

Canonical pointing is "intentionally communicative, indicating direction, location, objects and/or people" (Cormier et al., 2013, p. 234). As mentioned, referentiality of pointing gestures is not limited to acts of pointing at present referents, but also at real or imagined (Kendon & Versante, 2003) and concrete or abstract ones (McNeill, 1992). In SpL research, the typical pointing with a 1-handshape (viz., IFE) has been shown to serve various functions: it can be used "descriptively if it is produced as a typical deictic gesture, pragmatically if it emphasizes a particular word in discourse, or interactively if it is used to designate who is taking the floor" (Jokinen, 2010, p. 35).

Others have pointed out that the form of a pointing gesture is partly constrained by the kinds of functions it serves. For instance, Kendon and Versante (2003) have shown that pointing gestures produced by Neapolitan speakers varied in form depending on their functions, such as marking specificity or concreteness. While the index finger (the 1-handshape) is used preferably when it denotes particular (singular) objects, the B-flat handshape with the palm turned upwards is preferred to denote a general aspect of the point target related to a topic, as described by Kendon and Versante (2003):

> a general contrast seems to be marked by whether the index finger is used in pointing or the open hand is, such that in index-finger pointing there is always present the idea of the singularity of the object being referred to, whereas when

> the open hand is used the object pointed to is being referred to not in its singularity but in its status as a symbolic, conceptual, or exemplary object (p. 135).

Kendon (2004) has found similar results for British English speakers, and such findings as regards particular form preferences have also been echoed in SLs (e.g., in BSL by Fenlon et al., 2013).

These studies conducted on the various types of pointing in relation to the cultures associated with them underscore the fact that not all pointing gestures in SpLs are identical in nature, nor do they universally display the same kinds of handshapes. In line with this view, Wilkins (2003) highlighted in his work on the Arrernte speakers of North Central Australia that there was a high degree of conventionalization regarding the handshapes deployed, from which six different meanings of pointing were identified. For instance, "open-hand pointing with the palm vertical is used to indicate each straight segment of a complex route [while] horn-hand pointing indicates the direction of the end point of a route" (Wilkins, 2003, as cited in Kita, 2009, p. 6). In a similar vein, Haviland (2003) pointed out that Tzotzil (Mayan) speakers in Mexico used a flat handshape for pointing when expressing direction, whereas the extended index finger was used to single out an individual referent. Similarly, Enfield and colleagues (2007), analyzing video interviews in rural Laos, found out that speakers performed two types of hand pointing to provide route descriptions: B-points (displaying loose movement, an outstretched arm/elbow, and gaze aligning with the gesture) and S-points (smaller movement, articulated with the hand only). These two types, consequently, serve two distinct pragmatic functions. While the B-point gesture, bigger in size, carries foreground information, the S-point gesture portrays background information, which the authors argue: "responds to a possible but uncertain lack of referential common ground" (Enfield et al., 2007, p. 1733).

Another researcher, Cooperrider (2011), dedicated his doctoral dissertation to the study of co-speech pointing gestures in human communication. More specifically, he examined data drawn from an American television show made up of 40 dyadic interviews of native American English speakers, and found a weak link between the handshape of pointing gestures and first personal *vs.* possessive pronouns. Cooperrider's findings point toward a slightly greater association of a flat handshape with possessives instead of IFE-G directed to the self, which only amounted to 10%. Later on, in a 2014 study, Cooperrider demonstrated that pointing gestures in everyday conversations were not only used to refer to external referents, but that they were also deployed for internal uses, that is, as moves directed inward toward the speaker's body. Using the Tavis Smiley Show, the American TV show previously mentioned, as corpus (TSC) consisting of eight hours of data, he analyzed three kinds of body-directed gestures, namely, self-points, body-points, and body-anchors (a category "indicating a part or region of the body to anchor reference to experiential notions, sometimes quite abstract"; Cooperrider, 2014, p. 2). Cooperrider (2014) found that self-points were the most frequent category in the corpus, out of which 75% co-occurred with first-person singular pronouns (and derivatives, such as "my", "me", "myself", and "mine") while body-point referents included body-part terms and demonstratives. Lastly, body-anchors in the TSC Corpus turned out to be associated with notions referring to "instinct, dreams, feeling, and courage" (2014, p. 9). All in all, Cooperrider (2014) provides another interesting perspective on the traditional way of analyzing canonical pointing gestures, which display prototypical form and functions in the literature:

> Pointing is not a fixed form with a single blunt use but a subtle, multifarious tool. When people point to things – whether outward toward the world, or inward toward to the body – they sometimes point to the things in themselves. But other times they point beyond them and, in doing so, call forth a world of referents that would otherwise be out of reach (p. 15)

Drawing on these previously cited studies and Cooperrider's (2014) statement, research has largely focused on the prototypical kind of pointing gestures (viz., with an extended finger) as regards its form and functions, setting aside the other side of pointing's function in language use. Similar to the lack of research experienced in the SL field, there is a need for more systematic research investigating pointing in its home habitat (Schegloff, 1996) that is, as used by people in naturally occurring face-to-face conversations to convey interactional meanings. There are, however, a few notable exceptions, some of which are described in the remainder of this section.

Among researchers who have looked at the IFE-G beyond its referential purpose, there is the study of Freigang and Kopp (2015) on index-finger-pointing. The authors investigated the modifying functions of gesture in a multimodal corpus of one hour and 45 min. of recorded audio and video material. Their results show that index-finger extended pointing is not only used for referential meaning but also for modifying the co-occurring gestural or verbal content, thus marking an utterance as important or meaningful (Freigang & Kopp, 2015, p. 112). In another vein, but staying out of the referential track, Goodwin (2003) looked at pointing as a situated and interactive practice. The originality in Goodwin's approach is that he observed pointing activity in two very distinct settings: (a) an archeological field, and (b) the home of a patient suffering from aphasia who could only utter three words (but whose speech comprehension was intact). In doing so, Goodwin succeeded in showing that pointing represents "an opportunity to investigate within a single interactive practice the details of language use, the body as a socially organized field for temporally unfolding displays of meaning tied to relevant action, and material and semiotic phenomena in the surround" (p. 238).

Fostering this idea of pointing as interactively designed, Mondada (2007, 2014) conducted an analysis of index pointing gestures used as a way for speakers to predict possible turn completions and to project next speakers for turn taking. Pointing here plays a role in the organization of the turn-taking system in SpL interaction. Nevertheless, the data in which such observations were established consisted of a series of work meetings in a particular setting, and were centered on a specific type of collaborative activity. Participants were placed around a table, on which maps and other documents were laid, and they had to read, write, and correct cartographic representations. Pointing was therefore constrained by the specific setting and design of the study, which differs from Goodwin (2003), for instance, where the activities "occasion a constant dispersion of attention in fragmented spaces and where mutual attention has to be constantly re-achieved through intense interactional work" (Mondada, 2007, p. 198). Mondada's work, nevertheless, remains a crucial contribution to the field concerning the interactive roles of pointing in this particular kind of context.

One last researcher worth mentioning is Jokinen. In two papers, Jokinen and Vanhasalo (2009) and Jokinen (2010) examine pointing gesture, not just for its deictic aspect but also for the kinds of functions it carries out when used to manage conversations. In the first paper, Jokinen and Vanhasalo (2009) use the MUMIN coding scheme (Allwood, 2008) for the annotation and analysis of what they refer to as "stand-up gestures", a term equivalent to index pointing gestures, and for their function of singling out important aspects in discourse and directing the addressee's attention to these points of discursive focus. Drawing on a series of audio- and video-recorded examples of Finnish participants playing card games or having spontaneous conversations (e.g., over a lunch break), the authors demonstrate that index-pointing gestures can be deployed as part of various interactional practices. These include initiating self-repair as part of turns-at-talk (viz., repairing a misunderstanding with a stand-up gesture providing clarification directed at the addressee) or providing new information that "singles out the newsworthy content" (Jokinen & Vanhasalo, 2009, p. 17).

Similar findings were established for other roles of index-pointing gestures where pointing works to acknowledge and elicit shared understanding, mark shared *vs.* new information, and synchronize action between conversational partners (Jokinen, 2010). Based on a multiparty dialogue corpus, Jokinen (2010) looked at cases of pointing used as part of feedback expressions and as part of speakers' construction of common ground in naturally occurring conversations. More precisely, the data were collected in Japan in 2007. Intriguingly enough, none of the pointing gestures elicited in the data were strict prototypical deictic gestures. Jokinen attributed this result to the conversational activity: "the interlocutors [were] engaged in free flowing chatting with unrestricted topics and not e.g., in navigation or route guidance where pointing to concrete objects is common due to the nature of the task itself" (p. 38).

In sum, canonical index pointing has traditionally been examined as a pure deictic gesture whose primary function is to refer to something, abstract or concrete, in the speakers' environment. Yet, as discussed in the last part of this section, there are a substantial number of studies that have shown index pointing gestures' roles at the meta level of language in regulating the flow of conversation within the temporal unfolding and sequencing of social interaction, for both SpLs and SLs. The current goal in this chapter is to look at the interactional functions of IFE-Gs, and, as Jokinen (2010) states, "whether this equals 'pointing' in a concrete or abstract sense is something that we do not need to go into here" (p. 36). Rather, the present study intends to demonstrate that index finger forms can serve interactive functions in the context of signed and spoken interactions.

5 Detecting IFE-G in LSFB and BF Discourse

Similar to the detection of PU gestures in BF and LSFB discourse (in Chap. 3, section 5), Index-Finger Extended Gestures, transcribed as <IFE-G> and performed by the right (IFE-G:R), left (IFE-G:L), and both hand(s) (IFE-G:A, IFE-G), were annotated on an independent tier in ELAN devoted to the type of manual movement performed by the participant. In the previous section, the canonical pointing signs and gestures – characterized by the index shape – were presented according to the following distinct formational features: handshape, handedness, hand preference, and duration. Despite the focus of this dissertation to include a single handshape, viz., the index finger, a wider range of different IFE-Gs, which emerged as the annotation process moved forward were ultimately included. These cases are presented in section 5.3. The following sections introduce the process of identification of the IFE-G form in the LSFB and BF datasets (sections 5.1 and 5.2) as well as the categorization of IFE-Gs in both languages (section 5.4).

5.1 IFE-G identification in LSFB

The process for the identification of IFE-Gs differed from one language to another (LSFB-BF). The LSFB Corpus already contained two independent tiers in ELAN devoted to the annotation of manual signs performed by the right- and left-hand, or both. These tiers already contained the annotations of pointing as well as other index-shaped forms, including BUOYS (see Gabarró-López, 2017, for an analysis of BUOYS in LSFB), fully lexical signs, and depicting signs (coded as DS). Depicting signs denote the shape of an object as in tracing a rectangle with both index fingers to depict a television (e.g., LSFB Corpus, S004 in Task 04, 07:40.502-07:41.235) or points describing a path from one location to another. Despite being characterized by an extended index, these were not included in the annotations and analyses.

Therefore, the majority of pointing signs with an extended index were already annotated as part of a previous annotation step conducted by a deaf collaborator at the University of Namur (see Chap. 2 on Methodology). These pointing signs corresponded to categories of points toward a referent (PT:PRO), a location (PT:LOC), determiners (PT:DET) and possessives (PT:POSS) (following Johnston's guidelines for the coding of points in Auslan, 2010, 2015). Since they were already annotated, a first step in their identification for the present study consisted of searching for the corresponding glosses and identifying those produced with the appropriate shape of the index finger. These were collected into the initial set of IFE-Gs identified in the corpus by the LSFB annotator. For the next step, other subtypes of IFE-Gs were identified given they all displayed a 1-handshape form. These other subtypes are illustrated in the figures below (Figs. 53 to 57). These forms amounted to 42 tokens against 783 IFE-Gs in the LSFB Corpus, which represented 5% of all IFE-G forms ultimately identified. The LSFB annotator did not annotate *a priori* those forms as they did not correspond to the canonical "standardized" way of pointing in SL, but I annotated them as they were recognized to participate in the interactive design of SL conversations.

To sum up the identification process of IFE-Gs in LSFB, all tokens coded as "PT" were marked in the dataset as a starting point of the current analysis if they displayed the correct formational characteristic (viz., an index extended). In a second step, once these tokens had been annotated, I went through the dataset to identify whether there were other moments when an extended index finger was used and had not been annotated. This ultimately resulted, on the one hand, in excluding from analysis those functioning as determiners (coded as PT:DET), possessives (PT:POSS), and indicating a location (coded as PT:LOC), and, on the other, in including other kinds of IFE-Gs that had not been previously tagged by the LSFB annotator. These cases amounted to 5% of all IFE-Gs in LSFB (see section 5.3). Lastly, only those serving an interactive function were kept for the analysis of IFE-G's functions.

5.2 IFE-G identification in BF

In contrast with the approach adopted in the LSFB Corpus, the one adopted for the BF datasets differed to some extent. FRAPé and CorpAGEst did not contain prior annotation work for the type of movement performed by the hands. Therefore, all IFE-Gs had to be identified and annotated. The first frame of the annotation was put when the hand or the finger began moving toward the realization of an IFE-G. This can be performed by departing from the lap (rest position) or when the hand(s) are in midair position following the production of a previous gesture. In such cases, the beginning of the frame was put when there was a recognizable change pattern for the coder in the handshape and/or movement of the hand(s). The end frame of the IFE-G was placed prior to the frame when there was a clear intention to bring the hands back to rest position, or when the hands changed as regards their handshape and movement to perform the following gesture.

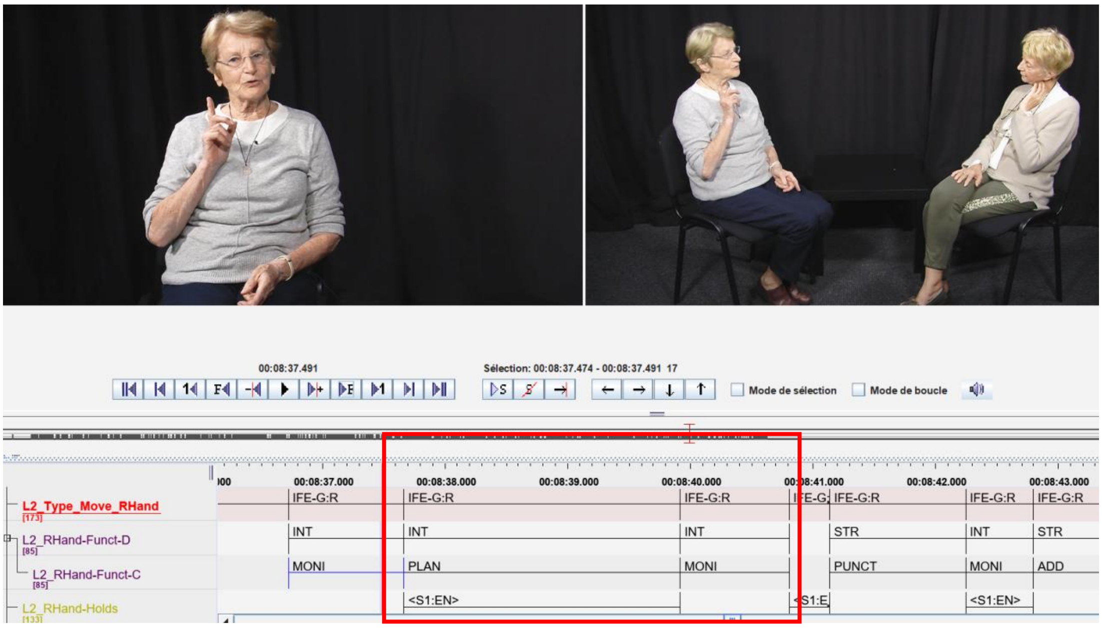


Fig. 52: ELAN grid for the annotation of IFE-G in FRAPé, Task 20, F001 (08:37).

5.3 Beyond annotating prototypical pointing gestures and signs

All in all, the definition adopted in the current framework to describe an IFE-G in LSFB and BF is a communicative body move involving a single index finger, hand or whole arm with an extended index – not necessarily intentional (see gesture's definition in Chap. 1) – projecting a vector toward a certain location in space to draw the addressee's attention to the particular salient point deemed relevant in the speaker/signer's utterance[35] (Cooperrider et al., 2018; Fenlon et al., 2019; Enfield et

[35] The characteristic of "drawing one's attention" corresponds to most IFE-Gs but this aspect cannot be determined nor applied with absolute certainty to all kinds of IFE-Gs as, for instance, the IFE-Gs displayed in Figs. 56 and 57, which do not appear to draw the addressee's attention. So, this trait of joint attention mentioned in the general definition is a characteristic that applied to most IFE-Gs but not to all.

al., 2007). Accordingly, by expanding the scope of the initial gesture definition, soon other IFE-Gs (non-referential) began to emerge in the data. They are illustrated below.

First, several kinds of IFE-Gs in LSFB and BF are included in the analyses (in addition to typical index pointing). They are characterized by a single raised index used to draw the addressee's attention to a salient point in the discourse or to emphasize a particular segment:

Fig. 53: Raised IFE-G in LSFB, Task 03, S002 (00:25.077-00:25.768) and BF, Task 03, F004, (03:51.651-03:52.552).

Also noted in the conversations of signers and speakers were moments of discrete use of the index as in the following examples:

Fig. 54: Reduced index in FRAPé, Task 03, F002 (05:58.305-05:59.825) and Task 03, F004, (7:45.508-.961).

Fig. 55: Reduced index in LSFB, Task 18, S001 (00:22.604-00:23.242).

These cases above appear as reduced forms of IFE-Gs (only the index is in motion) articulated in the locutor's lower space where only the index finger is discreetly extended. These are often accompanied by a hold or a quick flick of the index as a way to give feedback. On another occasion, what seemed an instance of a raised IFE-G on the lap, in the speaker's lower space, was observed (Fig. 56, left picture as similar to that in Figs. 52 and 53), while other kinds of index finger points, including self-directed points, were used for planning discourse (Fig. 56, right picture):

Fig. 56: Raised and self-directed index fingers in CorpAGEst, S2, C002 (03:28.880-03:30.140) and C004, S2 (00:26.470-00:26.904).

Lastly, a phenomenon that has been previously described in LSFB is the "flying index finger" or "*index volant*" (Notarrigo 2017, p. 82) (Fig. 57). Notarrigo (2017) refers to this kind of index as flying since it is described as void of any grammatical value and as "referring to nothing" (p. 82). However, these flying index fingers form a small part of the index practices deployed during signed conversation, and signers use them for a purpose of planning discourse, often during a moment of self-reflection before resuming signing (see Chap. 5 on holds):

Fig. 57: Floating index in LSFB, Task 03 (left) and Task 18 (right), S002.

In other words, all the IFE-Gs found in both languages – other than canonical index pointing – displayed a greater degree of variation regarding the following features: place of articulation (e.g., location in space), palm orientation (e.g., downward, upward, or sideways), and movement range (e.g., arm fully extended or index in full extension only).

In sum, cases included for analysis were identified based on the form they displayed at first, that is, those that were identifiable by a movement – articulated either by the whole arm, or only by the index finger while the other fingers remained more or less closed with the thumb closed or extended – and "indicating a particular location in space" (Fenlon et al., 2019, p. 7), and, second, by their functional role in context, which is addressed next.

5.4 IFE-G categorization in LSFB and BF

As mentioned in sections 3.3.4 and 3.3.6 of chapter 2, the second step in the annotation of IFE-G consisted of assigning a semantic-pragmatic function to all tokens when necessary (similar to PU in Chap. 3 and holds in Chap. 5). They were categorized according to previous functional typologies (Bavelas et al., 1992; Crible & Bolly, 2015). These categories were later adjusted and expanded upon to meet the current objectives set out in this dissertation (see section 3.4 in Chap. 2). The entire set of functions, in particular the interactive functions annotated, were introduced in Table 4 of section 3.3 in Chap. 2. Each token was annotated as belonging to a main domain (viz., macro-function) such as interactive ([INT]), and to a specific function (viz., micro-function) dependent on the macro-function tier. Sometimes, however, IFE-G was noted to carry more than one specific function. Then, both functions were assigned to IFE-Gs that were ambiguous or that simply had more than one function in context, as highlighted by Ferrara (under rev.): "token pointing actions were tagged for multiple functions when warranted. […] For example, a pointing action can be tagged as both pronominal and locative, or as interactive and pronominal" (p. 17).

In what follows, results for LSFB and BF cases of IFE-Gs are reported. After the quantitative overview, concrete examples drawn from the datasets are discussed to show how signers and speakers regulate their interaction through these index finger moves. More precisely, it is intended to show what functional roles these finger actions entail, and what distinctions or similarities in their use, if any, emerge between LSFB signers and BF speakers. Ultimately, the results outline the importance and relevance of considering these kinds of manual features within a theory of language that reflects language use (Ferrara, under rev.). I first discuss these cases in BF before turning to the results in LSFB.

6 Results

In the first section of the results, frequencies are reported quantitatively based on all IFE-G forms found in the data but not yet the function(s) they carry out in the context of their production (see section 6.2). Given that corpus samples varied in their duration, two types of frequency measures used in chapter 3 for PU were also applied here: (1) per 100 signs in LSFB, and per 100 words and out of the number of strokes in BF; and (2) per minute. Then, thanks to a more detailed analysis of interactive functions, the similarities and/or differences of use between speakers and signers are unveiled. Results are presented by language, corpus, and participant.

6.1 Distribution per language, corpus and participant

Participants produced 1057 IFE-Gs in total in approximately 3 hr 09 min of video-recorded material. These results take into account all IFE-Gs based on the forms found to have an index extended in LSFB and BF. Thus including the ones annotated as "PT" in LSFB given that the first aim is to provide an overall picture of the use of the index form in the dataset. Then, only in section 6.2 are those cases not included for the analysis of the interactive functions. Table 16 brings out IFE-G distribution across corpora and individuals:

C1 LSFB	N	/100 Tokens	/min	C2 FRAPé	N	/100 Tokens	/min	C3 CorpAGEst	N	/100 Tokens	/min
S001	207	11.668	12.79	**F001**	36	1.28	2.43	**C001**	6	0.50	0.62
S002	270	11.235	10.56	**F002**	10	0.52	0.87	**C002**	2	0.19	0.27
S003	99	7.517	8.42	**F003**	47	1.04	1.86	**C003**	5	0.35	0.46
S004	207	7.332	6.98	**F004**	77	1.89	2.96	**C004**	91	7.12	10.36
Total C1	**783**	**37.752**	**38.75**	**Total C2**	**170**	**4.73**	**8.12**	**Total C3**	**104**	**8.16**	**11.71**
Mean	*195.75*	*9.43*	*9.6875*	***Mean***	*42.5*	*1.1825*	*2.03*	***Mean***	*26*	*2.204*	*2.9275*
SD	71.09	2.33	2.53	**SD**	27.743	0.56841	0.89432	**SD**	43.367	3.389	4.9570

Table 16: Counts and dispersion of IFE-G across speakers and signers in each corpus.

Providing the overall picture of the number of IFE-Gs based on the form only, viz., regardless of the function and excluding holds (at the moment), the distribution by language (LSFB *vs.* BF) amounts to 74% of IFE-Gs produced by LSFB signers (783 tokens) *vs.* 26% of IFE-Gs articulated by BF speakers (274 tokens) in FRAPé and CorpAGEst together. Observing the results from Table 16 above, LSFB signers performed on average 9 IFE-Gs per 100 signs, while the ratio for speakers in FRAPé is 1 IFE-G/100 words and 2/100 words in CorpAGEst. As measures of standard deviation (SD) highlight, the distribution of 1-handshape IFE-G/100 tokens is strikingly more heterogeneous within one group of individuals in the BF datasets than in the LSFB dataset, revealing a greater variability between speakers of BF (especially for CorpAGEst speakers). A *t*-Test for independent samples was carried out to compare mean consistency scores of IFE-Gs per 100 tokens in LSFB signers and BF speakers. Levene's test indicated equal variances (F= 0.421, p = 0.531). LSFB signers produced more IFE-GS/100 tokens on average (M = 9.4325, SD = 2.33, N = 4) than speakers (M = 1.61, SD = 2.29, N = 8), for which there was a statistically significant difference established: t(10) = 5.537, p = 0.000, two tailed. These results suggest that when signers and speakers are compared, there is a significant statistical difference as to the number of IFE-Gs produced according to the language in use by participants (LSFB *vs.* BF).

When breaking down the number of IFE-Gs by corpus, 74% are performed by LSFB signers, 16% of IFE tokens are produced by FRAPé speakers, and 10% by CorpAGEst speakers. Linking the IFE-G results with those obtained for the PU gesture in Chap. 3, it is important to establish whether the statistically significant difference between LSFB signers and BF speakers is due to the corpus group of which the participants are a part. One of the conditions for conducting a one-way ANOVA is the homogeneity of variances obtained with the Levene test. In the case of IFE-G in the current samples, Levene's test is statistically significant, which means that the hypothesis regarding the equal homogeneity of variances cannot be assumed ($F(2, 9) = 4.916$, p = 0.036). Therefore, the non-parametric alternative to the one-way ANOVA, the Kruskal-Wallis test, was conducted. Kruskal-Wallis can be used to test whether there are any statistically significant differences between the three corpora – LSFB signers (Group 1), FRAPé (Group 2), and CorpAGEst speakers (Group 3) – regarding the average scores of IFE-G/100 tokens. The result showed that a statistically significant difference appeared in the score of IFE-G/100 tokens between the three different corpora ($\chi^2(2) = 8.000$, p = 0.018), with a mean rank IFE-G score of 10.5 for LSFB, 5.5 for FRAPé and 3.5 for CorpAGEst. Therefore, another non-parametric test – the Mann Whitney test – was further applied to locate the origin of this difference and compare each corpus' score to one another. A significant difference was established for LSFB signers, who performed statistically more IFE-Gs/100 tokens than CorpAGEst and FRAPé speakers did (p = 0.021). By contrast, no statistically significant difference was found between FRAPé and CorpAGEst speakers (p = n.s.). These results suggest that the language used by the participants (LSFB *vs.* BF) seems to be decisive in the production of IFE-Gs.

Before entering into the interactive functions of IFE-Gs, it is revealing to observe the number of IFE-Gs produced by the participants. In the LSFB data, signer S001 is the one who produces the most IFE-Gs/100 signs with almost 12 IFE-Gs/100 signs. She is closely followed by her interview partner, S002, with 11 IFE-Gs/100 signs. Then, the other dyad, composed of S003 and S004, articulates slightly fewer IFE-Gs/100 signs with 7.5 for S003 and 7.3 for S004.

The results presented by speaker are presented by considering the number of strokes performed by each participant[36]. For speakers, the results are quite mixed and less balanced. In FRAPé, the number of IFE-Gs/100 words is also spread out in each group. First, FRAPé speakers range from 2 IFE-Gs/100 words (F004) and 1 IFE-G/100 words (F001 and F003) to almost no IFE-Gs at all (F002). As regards the number of IFE-Gs out of the number of gestural strokes, F001 produces 1 IFE-G every 8 strokes and F004 uses 1 IFE-G every 10 strokes while F002 and F003 articulate 1 IFE-G every 15 and 14 strokes, respectively. As for CorpAGEst speakers, there is one individual whose production of IFE-Gs/100 words is similar to that of signers S003 and S004. That CorpAGEst speaker is C004, who produces 7.1 IFE-Gs/100 words and 1 IFE-G every 3 strokes while the other speakers' performances revolve around 0.3 IFE-Gs/100 words and 1 IFE-G every 20 to 25 strokes for C001 and C003, respectively.

An interesting question to ask is this: are those who produced the most IFE-Gs also those who articulated the most PUs in chapter 3? The outcome is relatively mixed. In chapter 3, S004 was the one producing the most PUs (8/100 signs), while he produces here the lowest number of IFE-Gs/100 signs (7.3/100 signs). Similarly, S002, who ranked lowest for PU (4.3/100 signs), is one of the two signers with the most IFE-Gs (11/100 signs), along with S001 (12/100 signs). Linking these results with PU, the same hierarchical order for PU frequency in chapter 3 is maintained for IFE-G in the FRAPé Corpus here, that is, F004 was the one articulating the most PUs/100 words (5 PUs), followed by F001 (4 PUs), F002 (1.83 PUs), and, lastly, F003 (1.15 PUs). As it is the case for IFE-Gs with F004 and F001 as the ones producing the most IFE-Gs, and F002 and F001 the least. However, the number of PUs is more important than the number of IFE-Gs. As for CorpAGEst speakers, C004 produces 7.1 IFE-Gs/100 words while C001 and C003's performances revolve around 0.3 IFE-Gs/100 words (*vs.* 4.26 PU for C001 and 2.75 PU for C003). By contrast, for PU production, C004 produced many fewer PUs in her discourse (1.72/100 words). It could be hypothesized that she uses the IFE-G for functions for which others would use the PU, an aspect that will be kept in mind for later comparison as regards the kinds of functions IFE-G entails in C004's discourse compared to those of PU.

In the meantime, the figure below visually displays these individual tendencies (diamonds are for LSFB signers, circles are for FRAPé speakers and triangles for CorpAGEst participants):

[36] As mentioned, because speech rate and the number of gestures vary from one person to another, it was decided to calculate the average number of tokens out of the total number of words + strokes for BF speakers. This decision was also sustained by the fact that in order to compare sign from SLs, it is mandatory to consider speech+gesture as an ensemble (see Vermeerbergen & Demey, 2007).

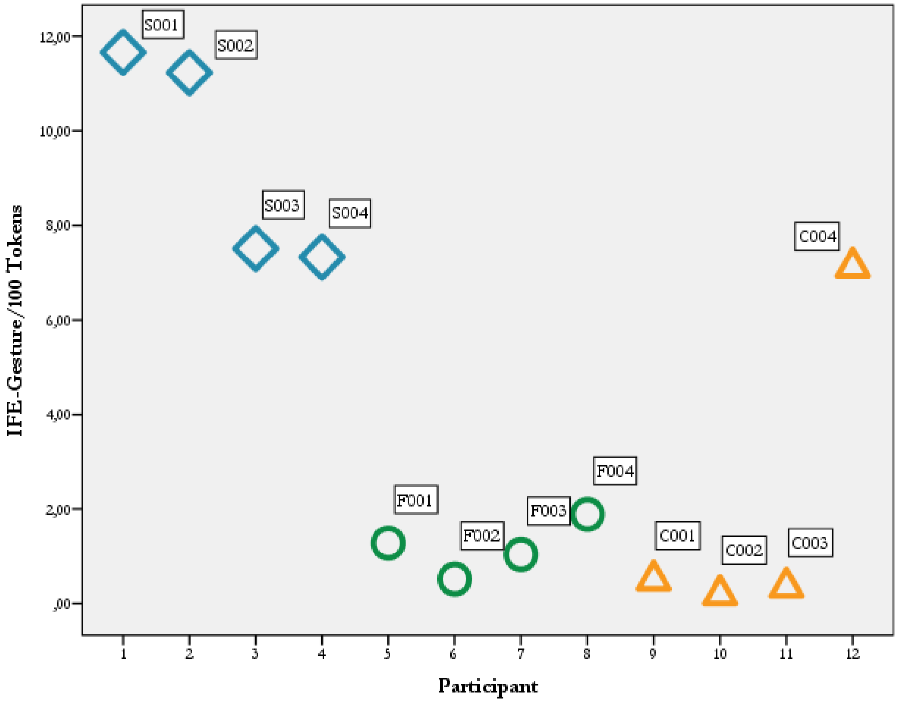
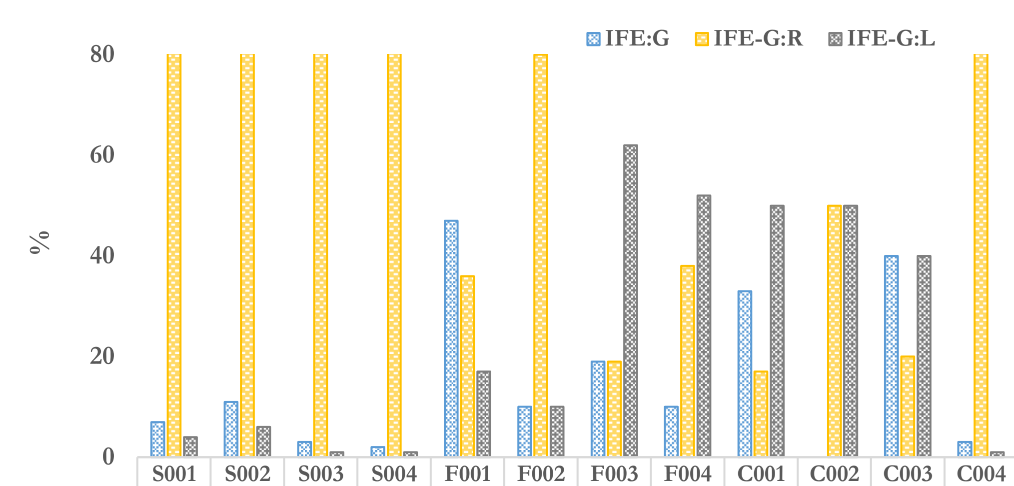


Fig. 58: Counts and dispersion of IFE-Gs/100 tokens across speakers and signers in each corpus.

This figure brings out a few interesting points that are worth acknowledging to summarize the above-mentioned findings on overall IFE-G production. The general picture highlights the fact that LSFB signers perform more IFE-Gs/100 signs than speakers do (except for the peculiar behavior of C004 in CorpAGEst who is closer to the signers' production of IFE-Gs). Secondly, BF speakers are, overall, rather homogeneous in their production of IFE-Gs in that they all remain below the average articulation of 2 IFE-Gs/100 words (except for C004, as mentioned). Yet, the tendency within the LSFB Corpus is homogeneity within dyads but not among all signers. In other words, what is notable in the IFE-G production is the homogeneous character of IFE-Gs produced per 100 signs in the LSFB dyads. The figure brings to the fore that both S001 and S002 produce on average 11 IFE-G/100 signs while the same holds true for S003 and S004 who both perform 7 IFE-G/100 signs.

Before turning to the specific roles of IFE-Gs in conversation, results as to hand preference and handedness in LSFB and BF are presented. Fig. 59 brings out the distribution in percentages of these aspects by participant ("IFE-G" represents two-handed forms, "IFE-G:R" and "IFE-G:L" correspond to right- and left-handed IFE-G, respectively):



	S001	S002	S003	S004	F001	F002	F003	F004	C001	C002	C003	C004
IFE:G	7	11	3	2	47	10	19	10	33	0	40	3
IFE-G:R	89	83	96	97	36	80	19	38	17	50	20	96
IFE-G:L	4	6	1	1	17	10	62	52	50	50	40	1

Fig. 59: Distribution of IFE-G hand preference and handedness in number and percent per participant.

The vast majority of IFE-Gs in LSFB are one-handed (only 6.5% of all IFE-Gs in the LSFB Corpus are two-handed *vs.* 93.5% of one-handed IFE-G forms). In addition, signers, as regards hand dominance, clearly resort to their dominant hand (viz., right) more often than their non-dominant hand (viz., left) to make IFE-Gs (although IFE-Gs can also be articulated with the left hand). Another intriguing point is the notable difference between both dyads as to hand preference. There is a greater inter-individual variation (between dyads) as regards the hands used to produce IFE-Gs compared to an intra-individual variation (within dyads). Thus, not only do signers produce a similar number of IFE-Gs within dyads but they also use the same hands to do so. For two-handed IFE-Gs, S001 and S002 average about 10% while S003 and S004 average 2% to 3%. For IFE:G-R, S001 and S002 produced over 80% of their IFE-Gs with their right hand *versus* more than 90% for S003 and S004. Lastly, 4% to 6% of S001 and S002's IFE-Gs were left-handed, and only 1% of S003 and S004's. By contrast, among BF speakers, there is more inter- and intra-individual variation. Although there are more one-handed IFE-Gs than two-handed ones, the results depict a greater heterogeneous picture as much for hand preference as for handedness. Indeed, some participants produce more two-handed than one-handed IFE-Gs (e.g., F001).

Moreover, while the majority of speakers prefer to use the right hand, some perform more IFE-Gs with the left hand (e.g., F003, F004, and C001). As regards a possible association between hand dominance and hand preference in the production of IFE-Gs, in LSFB, the results presented in Fig. 59. concur with such an assumption. Indeed, all LSFB signers have the right hand as their dominant signing hand and they all produce IFE-Gs with their right hand. However, the results for BF are more mixed and a link between hand preference for IFE-Gs and hand dominance cannot be sustained.

To summarize, first, as regards the question: do speakers and signers produce more one- or two-handed IFE-Gs? One-handed uses of IFE-Gs in LSFB are more common than two-handed forms (although two-handed forms also occurred in the data). The same holds true for BF speakers, for whom most IFE-Gs were articulated with one hand instead of two, but the results were more heterogeneous in BF. Second, as to hand preference, the link between the dominant *vs.* non-dominant hands for IFE-G is more clearly established for LSFB than BF, for which a link is less straightforward. There is a greater inter- and intra-individual variability for BF speakers than LSFB signers. One possible avenue for explaining this aspect is that, as Taub (2001) mentioned, SLs "incorporate pointing into their grammar and vocabulary in conventionalized ways" (p. 67). IFE-Gs are thus more consistent and display less variation across usage in LSFB than BF, a finding that, at this stage of analysis, concurs with Fenlon et al.'s (2019) results with respect to hand preference and dominance:

> [S]igners consistently preferred to use one hand [while] gesturers were less consistent overall and used more two-handed pointing gestures […]. Signers are known to favor their dominant hand when signing (Johnston & Schembri 2007). […] Together these findings are consistent with the conclusion that variation in form amongst signers is grounded within a linguistic system (in this case, a phonological system), whereas variation within gesturers is not similarly constrained (p. 17).

The current findings support – to some extent – Fenlon et al.'s (2019) claim with respect to the overall picture of IFE-Gs in LSFB and BF. There seems to be a clear-cut distinction between both languages as regards the number of IFE-Gs in each language (as corroborated by statistical tests demonstrating a significant statistical difference between LSFB and BF for the average IFE-G scores per 100 tokens). Nevertheless, the aim of the current research is to establish the extent to which LSFB and BF make use of the IFE-G as part of their interaction, unveiling a possible interactional overlap between both languages. The following section concentrates exclusively on a more detailed analysis of the interactive functional behavior of IFE-G in the conversation of signers and speakers.

6.2 Interactional cases of IFE-G in SL and SpL conversations

The results outlined below focus on the interactional potential that IFE-Gs carry in the discourse of signers and speakers. More specifically, two questions are tackled: (1) how frequent is this manual phenomenon in SL *vs.* SpL interaction? (2) For what kind of interactive purposes are these IFE-Gs used? Ultimately, the implications for considering these types of gestural forms as part of language theory for both SpLs and SLs are discussed.

6.2.1 IFE-Gs in LSFB discourse

Table 17 brings out the frequencies and distributions of all IFE-Gs found in the LSFB Corpus:

Function Domain	N (Tokens)	% (n = 783)
PT:PRO	506	65
PT:DET	126	16
PT:LOC	67	8.5
INTERACTIVE IFE-Gs	63	8
PT:POSS	9	1
DS	7	0.9
Other	5	0.6
Total	783	100

Table 17: Distribution of IFE-Gs by number and percent across the main functions in LSFB.

The results found in LSFB confirm what is traditionally reported in the literature on SLs: the majority of 1-handshape pointing forms are primarily used to indicate a referent (PT:PRO, 65%), a location (PT:LOC, 8.5%), and to serve a determinative function (PT:DET, 16%). There are, however, a notable number of IFE-Gs used for interactive purposes (INT IFE-Gs) by signers in the LSFB dataset analyzed, totaling 8% of all the IFE-Gs. Looking at the proportion of INT IFE-G devices per signer, S003 and S001 are the ones who perform most of them with 36.5% (23 tokens) and 35% (22 tokens), respectively. These results are followed by those of S004 with 20.5% (13 tokens) and, lastly, S002 with 8% (5 tokens). In each dyad (S001-S002 and S003-S004), there is one signer who produces more interactive IFE-Gs than his/her partner does. This tendency will be scrutinized further once the specific interactive functions of IFE-Gs in LSFB have been explored. These results are displayed below:

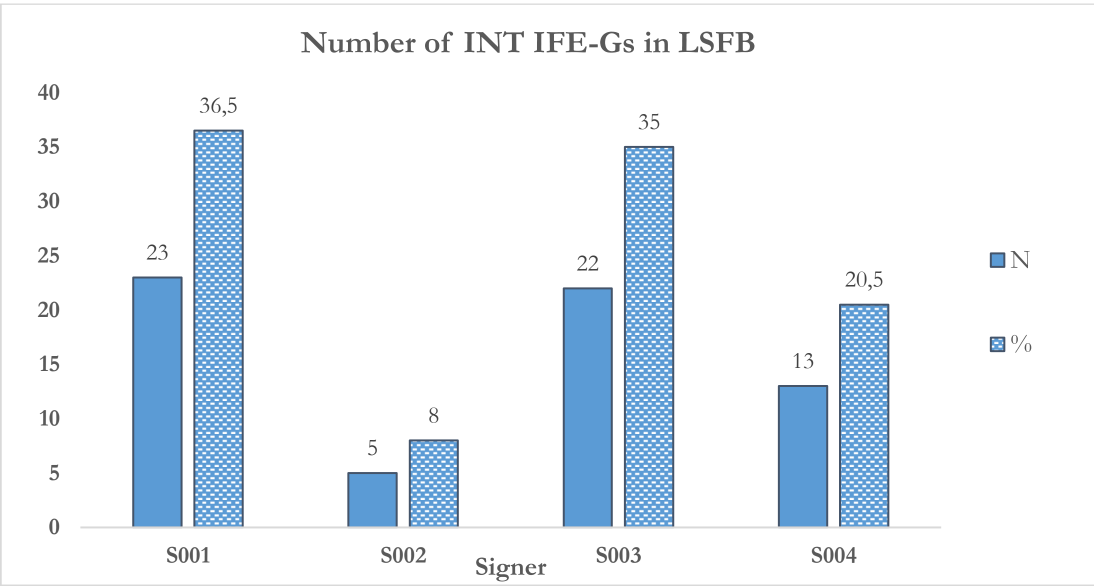


Fig. 60: Distribution of all interactive IFE-Gs found in LSFB in number and percent per signer.

6.2.2 IFE-Gs in BF discourse

Among all the IFE-Gs performed by speakers, what is the proportion of interactive IFE-Gs in BF and within each BF dataset, FRAPé and CorpAGEst? Out of the 274 IFE-G tokens deployed by speakers in BF, 78 tokens were interactively designed, which amounts to 28.5% of all IFE-Gs in BF[37]. Table 18 brings out the number of interactive IFE-Gs per corpus:

Function Domain	N (Tokens)
INTERACTIVE IFE-Gs FRAPé Corpus	43/170 *(25%)*
INTERACTIVE IFE-Gs CorpAGEst Corpus	35/104 *(34%)*
Total	78/274

Table 18: Distribution of IFE-G across the main functions in BF by number and percent.

Out of the total number of IFE-Gs identified for all speakers, 25% (43/170 tokens) were INT IFE-Gs in FRAPé against 34% (35/104 tokens) in the discourse of CorpAGEst speakers. The next figures illustrate the number of interactive IFE-Gs as produced by each speaker in each corpus (by percent and the exact number of tokens per participant):

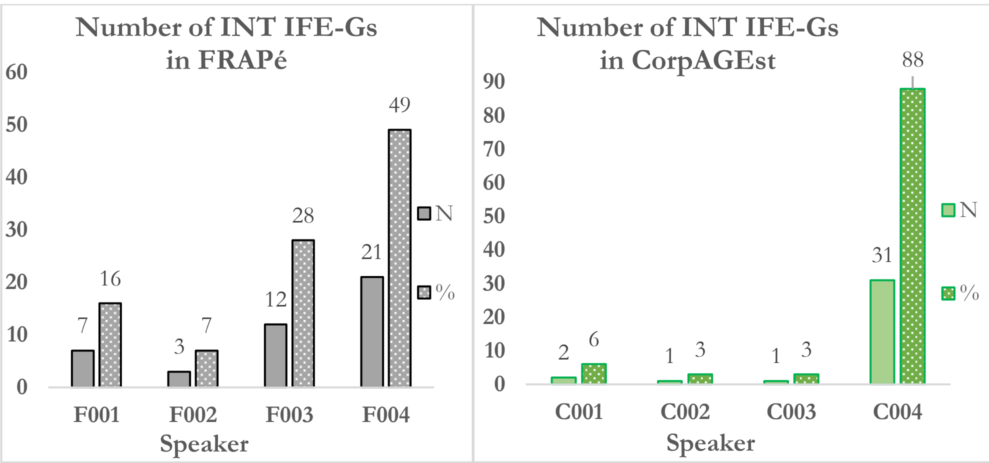


Fig. 61: Distribution of all interactive IFE-Gs found in BF in number and percent per speaker.

In FRAPé, almost half of all the interactive IFE-Gs are produced by F004 (49%, 21 tokens), followed by F003 (28%, 12 tokens), F001 (16%, 7 tokens), and, lastly, F002 (7%, 3 tokens). In CorpAGEst, there is also only one speaker who performs most of the interactive IFE-Gs, viz., C004 (88%, 31 tokens). She is followed by C001 (6%, 2

[37] An important note is that only IFE-Gs with an interactive role were annotated for function in the BF datasets. The results presented in Table 17 provide an overall overview of the different types of pointing in LSFB because the annotations were already performed by the LSFB annotator. However, for time reasons and motives set out in this dissertation, the same was not done to the BF datasets.

tokens), C002, and C003, who each only articulated one occurrence of interactive IFE-G in the samples (3%).

It is relevant to remind the reader of the importance of maintaining a distinctive presentation of the results within the BF corpora, FRAPé and CorpAGEst. While it is enlightening to compare LSFB directly with its spoken counterpart, BF, it nonetheless remains important to break down the results in BF by corpus to verify whether the setting (or other variables such as perhaps the family tie existing between participants) may affect the outcomes. Such implications are discussed in the last section.

Thus, results in BF highlight that speakers perform interactive moves with IFE-Gs more than LSFB signers do. These 1-handshape moves represent 25% of all cases in FRAPé and 34% in CorpAGEst *vs.* 8% in LSFB. Nevertheless, despite these differences, the results reinforce the fact that interactive functions of IFE-Gs exist and form part and parcel of language use in speakers' and signers' conversations. The fact that previous research has tended to overlook their roles in conversation is not supported by the current results that attest their presence as a paramount feature of spoken and signed discourse. The next sections shed light on their specific interactive functions in LSFB and BF, providing a quantitative and qualitative discussion for each language using examples taken from the corpora of the most frequent functions (e.g., marking turn-taking or providing feedback *vs.* finding common ground and monitoring).

6.3 Zoom into the interactive dimension

6.3.1 In LSFB discourse

The table below introduces the frequencies obtained for the specific interactive functions that IFE-Gs were noted to serve in the discourse of LSFB signers. These results present the number of tokens identified as carrying one of the functions defined as interactive in the current research and the percentages. As brought out by Table 19, IFE-G tokens can sometimes serve more than one function. When this was the case, the second function identified is indicated next to the interactive one (e.g., turn-opening + opposition).

Functional Category Interactive [INT]	**N**	**% of INT IFE-Gs (n = 63)**
Agreeing	27	43
Turn Opening	15	24
Monitoring	5	8
Suspending	4	6.5
Planning	4	6.5
Turn-Give	2	3
Common Ground	2	3
Delivery	1	1.5
Monitoring + Planning	1	1.5
Turn Closing	1	1.5
Turn Opening + Opposition	1	1.5
Total	63	100

Table 19: Number and percent of IFE-G's interactive functions in LSFB.

In the LSFB Corpus, signers mostly use the IFE-G for interactive purposes when it comes to providing feedback (showing agreement and following, 43%) and regulating their turn-taking system (for opening, suspending, giving, and closing one's turn, 36.5%). Yet, there are also a fair number of IFE-G tokens used to check for understanding and attention (viz., monitoring) and to plan upcoming discourse segments (viz., planning) in 8% and 6.5% of cases, respectively. By contrast, LSFB signers rarely use interactive IFE-Gs to indicate shared knowledge with their addressee (viz., common ground) or for handing over new and/or relevant information to their conversational partner (viz., delivery).

Zooming into the individual interactive functions presented in Table 19 above, some of them combined with referential functions identified for SLs, namely, pronominal, determinative, and locative. For instance, 7 out of the 27 tokens for the agreeing function of IFE-Gs combine with pronominal points in LSFB. The same holds true for turn opening (7/15 tokens). Turn giving, turn suspending, and planning functions have half of their tokens that associate with pronominal IFE-Gs. Monitoring IFE-Gs also combine with referential purposes (3 tokens out of 5). Lastly, an instance of common ground combined with a locative function was found in the discourse of S003 (Task 03). These results concur with Ferrara's (under rev.) findings highlighting that pointing actions can serve simultaneous interactive and non-interactive functions.

Comparing the LSFB data with the only study conducted thus far on the interactional potential of index finger pointing actions in NTS signers (Ferrara, under rev.), the results outlined for LSFB concur with Ferrara's findings for NTS. Ferrara found comparable results for the most and least frequent interactive functions for pointing actions. Broadly, Norwegian signers produced index pointing for turn-taking management (45.3%) and for providing feedback (28.3%), which made these two functions the most frequent ones in NTS. A similar tendency is found in LSFB. Moreover, Ferrara also found that signers barely used pointing actions for delivery functions (3.9% in NTS), which is also the case in LSFB. The following examples illustrate the different functions for which IFE-G is used in LSFB.

6.3.1.1 Expressing feedback through IFE-Gs

Participants not only seek agreement or understanding from their conversational partners but they also continuously show their addressee that they are following and agree with what he/she is saying. Without necessarily being in response to a question, IFE-Gs carrying an agreeing function include cases in which the signer (often acting as the addressee in response to the primary signer who holds the floor) displays his/her approbation or following of what is being communicated. Instances of agreeing IFE-Gs can be paraphrased as “"I agree" or "I understand" (Bavelas et al., 1992), and are thus expressions of feedback and backchannels. The function of showing agreement/following in the LSFB dataset analyzed for the present study was the most frequently expressed function through IFE-Gs used by signers (43%). The example below illustrates the signer S001 giving feedback to what the primary signer is saying in a conversation about their past life experiences. S002 is telling S001 how different suitors used to court her but how her mother did not let her marry whomever she wanted. In the sequence, S001 asks for some clarification as regards the man S002 is talking about. She asks: “The same one as the one you mentioned earlier?”, and S002 directly clarifies: “No, no, another one, hearing”. As S002 signs “hearing” [ID-gloss: HEARING], S001 produces a very subtle right-handed IFE-G on her lap:

(14) S002: DIFFERENT+ HUMAN [HEARING]
No, no, another one. Hearing.

S001: [INT IFE-G]

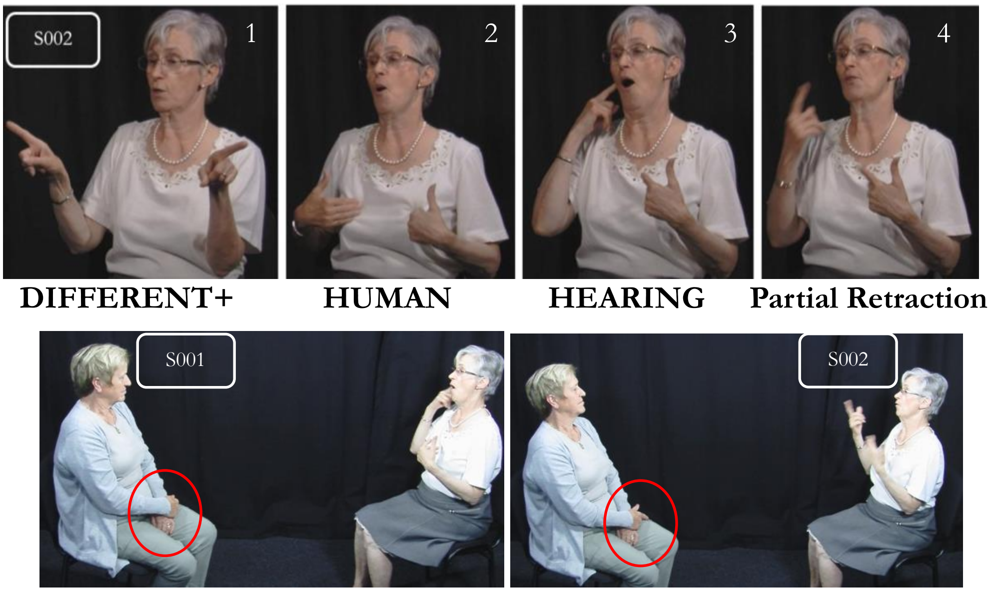


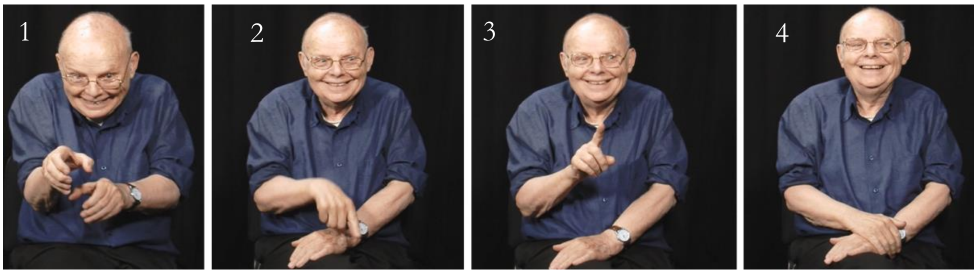
Fig. 62: IFE-G expressing AGR in LSFB, Task 18, S001 (4:43-4:49).

The discrete IFE-G toward S002 is accompanied by a large head nod to show S002 she received the correct information and now understands whom she is talking about. An understanding expressed via the combination of the interactive IFE-G and the non-manual, viz., nod.

Interestingly, discrete uses of the index as an interactive strategy where only the index is in motion were frequent in the analyzed dataset. They were often articulated in the signer's lower space, on his/her lap, as a way to provide feedback (18 tokens out of 27). Although Swedish signers in Mesch's (2016) study did the majority of feedback expressions non-manually, she found that STS signers could produce manual feedback on their lap. Ferrara (under rev.) also found a similar outcome for NTS signers who "were able to effectively point with both large and small movements" (p. 13), just as LSFB signers did.

In another instance of an agreeing IFE-G, S003 and S004 are talking about how they used to go down the banister in their house. While laughing, S003 warns S004 that it was mandatory to brake quickly with the hands in order not to get hurt. As S004 responds to S003 (picture 5), S003 overlaps with his right hand performing an index finger extended to provide an agreeing response to S004, to show his agreement and following:

(15) S003: DS:GRIP FOR BRAKE MUST [**GSIGN-INT. IFE-G**]
Yes, it was mandatory to brake with the hands. Oh, yes!



DS:GRIP MUST GSIGN (INT. IFE-G) Return

Fig. 63: IFE-G expressing AGR in LSFB, Task 18, S003 (4:18.790-4:21.420).

6.3.1.2 Turn managing through IFE-Gs

Just as signers frequently use IFE-Gs to express feedback, they also perform IFE-Gs to regulate their turn-taking system (e.g., for opening, giving, holding, and closing turns). In the data, the entire set of turn regulating functions amounts to 36.5% of all IFE-Gs produced. Among the specific turn managing functions, signers use IFE-Gs to open or close a turn (25.5% and 1.5%), to give one's turn to the addressee (3%), and also during moments of suspension. These moments often take place when the signer wishes to pause his/her turn (6.5%), for instance, "to allow for a small insertion or comment from another interlocutor" (Ferrara, under rev., p. 32). An illustration of giving one's turn through an IFE-G is provided in the figure below. In this context, S003 and S004 are talking about the accessibility of information to the deaf community in Belgium compared to other countries in Europe:

(16) S003: PT:LOC ALWAYS SUBTITLES+ ALWAYS NS:HOLLAND SL HAVE NS:HOLLAND GOOD **INT. IFE-G**

They have subtitles as well as translations into sign languages.

GOOD **INT. IFE-G** **Return**

Fig. 64: IFE-G expressing TURN-GIVE in LSFB, Task 03, S003 (7:56-7:59).

S003 indicates to his conversational partner (S004) that his turn is ending, and that he is free to take the floor. Once S003's right hand returns to its rest position, after producing the interactive index as a "go ahead, the floor is yours" gesture, S004 has already raised his hands from rest position to begin his turn.

6.3.1.3 Discourse planning through IFE-Gs

In section 5 of this chapter, cases of flying index were briefly presented based on the form they displayed. These kinds of 1-handshape forms are typically produced when the signer is expressing trouble with his/her own signing production and needs a moment to reflect upon what is coming next in his/her discourse.

In Task 03 (about childhood memories), S002 is talking about her first days at school. As she finishes discussing how nice her primary teacher was, she begins telling S001 how one day her dad came to school with a very smart dog to pick her up at the end of the school day. She explains that from that day onward, it became their daily routine. During the transition between topics one and two (viz., teacher *vs.* walking home with her new dog), which is marked by a hold of both her hands in neutral space (pictures 3-4), S002 experiences a few seconds of hesitation as she is thinking about what is coming next. During that time, she articulates several IFE-Gs with no grammatical values; they are simply conveying her planning:

(17) S002: BUT(BA) **IFE-G IFE-G** PT:POSS DAD BRING NEW DOG VERY SMART **IFE-G**

But… one day my dad brought a new dog to school. He was very smart.

Fig. 65: IFE-G expressing PLAN in LSFB, Task 03, S002 (00:25-00:29).

Fig. 65 illustrates how the production of floating IFE-Gs allows the signer to take a moment during his/her sign production to reflect upon what is coming next in discourse. Following the sign BUT, S002 produces a first IFE-G that lasts for 310 ms, which is used for preparing the beginning of her discourse ("my dad…") but that move is suspended through the use of the IFE-G. Once she resumes signing, she tells the story that one day her dad came to pick her up from school with a new dog. She specifies to her addressee, S001, that the dog was very clever. Again, another floating IFE-G whose function is to plan the upcoming discourse is produced (picture 11). This last IFE-G might also be the result of the previous lexical sign glossed as CLEVER, which is produced with the same hand configuration (an extended index finger). As highlighted in previous work, the production of a particular move, in this case, an IFE-G, may be influenced by the surrounding phonological environment (McKee & Wallingford, 2011, p. 225). In addition to their planning function, these floating IFE-Gs can be also construed as a way for the signer to indicate to the addressee that s/he has not finished signing yet. They might also be used as a turn holding strategy without risking losing the floor as the hand(s) remain(s) in midair position rather than going back to rest position, which would more concretely indicate turn completion and a possibility for the next signer to take over.

6.3.2 In Spoken BF: FRAPé and CorpAGEst Corpora

Table 20 below brings out the distribution of the interactive functions of the IFE-G as used by speakers from the FRAPé and CorpAGEst Corpora:

FRAPé			CorpAGEst		
Functional Category Interactive	N	% of INT IFE-Gs (n = 43)	Functional Category Interactive	N	% of INT IFE-Gs (n = 35)
Monitoring	14	33	Monitoring	10	28.6
Common Ground	9	21	Planning	8	23
Planning	8	19	Delivery	4	11
Agreeing	4	9	Common Ground	3	8.6
Monitoring + Punctuating	3	7	Suspension	2	6
Delivery	2	5	Turn Opening	2	6
Elliptical	1	2	Elliptical	1	2.8
Turn Opening + Opposition	1	2	Disagreeing	1	2.8
			Turn Opening + Opposition	1	2.8
Planning + Reformulation	1	2	COGR + Opposition	1	2.8
			COGR + Planning	1	2.8
			MONI + Emphasis	1	2.8
Total	43	100	Total	35	100

Table 20: Number and percent of IFE-G's interactive functions in FRAPé and CorpAGEst.

The functional categories reported as the most frequent ones in spoken BF are the same in both BF multimodal corpora but with varying degrees of use. For instance, the most frequent interactive function in both FRAPé and CorpAGEst is the monitoring of the addressee through the IFE-G (33% in FRAPé *vs.* 28.6% in CorpAGEst). In second position in FRAPé comes the expression of COGR (21% *vs.* 8.6% in CorpAGEst), while the second most frequent one in CorpAGEst is planning (23% *vs.* 19% in FRAPé). Delivery of new or relevant information to the addressee also forms part of the most common uses of IFE-G in CorpAGEst (11%) but not so much in FRAPé (5%), whereas expressing feedback (viz., agreeing function) is only present in FRAPé (9%) and not in CorpAGEst.

It can already be stated that in comparison with LSFB, the interactive functions of IFE-Gs as used by speakers in BF are slightly different that the ones used by signers. In BF, the interactive roles of IFE-Gs are more linked to the manipulation of the content of the information given to the addressee by the primary speaker (viz., introducing new *vs.* shared knowledge, as well as seeking following from the addressee) rather than the structured organization of the conversation itself (viz., managing turn-taking and providing feedback). In what follows, these primary functions are illustrated and discussed.

6.3.2.1 Monitoring the addressee through IFE-Gs

The following example (18) displays how the extended finger can be raised upwards and still direct the addressee's attention "towards some (contextually salient) object rather than denoting a particular deictic relation" (Jokinen, 2010, p. 36). The speaker in FRAPé, F002, is talking about her childhood memories. She tells her conversational partner about when one of her brothers was born and they did not have electricity at the time:

> **(18) F001:** They didn’t have electricity when one of my brothers was born [IFE-G:R]
>
> **F002**: [mm]

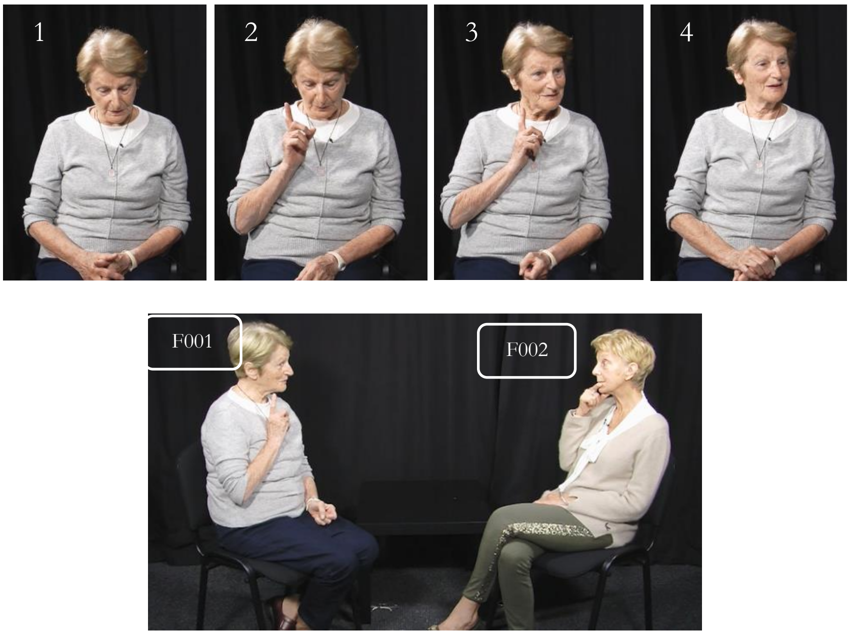


Fig. 66: IFE-G expressing MONI in FRAPé, Task 03, F001 (00:46-00:50).

When she performs the raised index extended finger gesture, she singles out the “word or phrase from the utterance as important making the expression to stand up from the flow of speech” (Jokinen & Vanhasalo, 2009, p. 16), that is, the fact that they did not have electricity when her mother gave birth to her brother. In doing so, she is seeking attention from her addressee and to direct F002’s attention to the point of her speech. In response to F001’s index gesture, F002 provides a backchannel response in the form of “mm”.

The situation in (19) is to some degree similar to (18) in that the same function (viz., monitoring) has been assigned to the IFE-G produced by each speaker in the two corpora, but the difference in (19) lies in the movement and orientation of the gesture produced. The topic deals with C004’s experience with growing older. Her granddaughter, who acts as the addressee in the interview, asks about the positive aspects of her current life situation. C004 tells her that she is very keen on her piano. But then, her granddaughter tries to tell her that this is not the only positive aspect in her life but that her family is important too. On that note, C004 responds that she agrees and that she particularly enjoys having a chat with Robert on the phone:

(19) C004: I like talking on the phone with Robert. I like it. <u>It's true, you know [IFE-G:R].</u> So euh

Fig. 67: IFE-G expressing MONI in CorpAGEst, S3, C004 (03:36.049-03:37.189).

As soon as C004 finishes her idea of enjoying phone conversations with Robert: "I like it", her right hand, held in midair position in the neutral space in front of her, is raised in the form of an extended index finger directed at the addressee as she says "It's true, you know". The IFE-G here explicitly addresses the interlocutor. More specifically, it seeks following in what is being said. It is also often characterized by verbal equivalents such as "you know" or "eh?" at the end of a phrase (Bavelas et al., 1995), which is the case in (19). Hence, the gesture is directed toward the addressee, her granddaughter, with the index extended. In turn, the addressee immediately provides feedback in the form of a backchannel response "mm" and two head nods to show the primary speaker she is following what is being said.

6.3.2.2 Indicating common ground through IFE-Gs

One typical use of the index, combined in the present example with an open palm and an extended thumb, is to indicate that the information conveyed by the speaker to the addressee is shared knowledge between them. In Fig. 68, the context is the following: F004 (speaker on the left) talks about her different hobbies to F003 (on the right). One of them is reading books. She explains that she joined a book club and one reason why she did is that a couple of friends convinced her to. As she utters "you know them" in reference to her friends, she raises her left hand from rest position with an IFE-G in direction of the addressee:

(20) F004: It's because I have a couple of friends, <u>you know them [IFE-G:L]</u>

Fig. 68: IFE-G expressing COGR in FRAPé, Task 15, F004 (06:53.330-06:53.725).

While the IFE-G in this example corresponds to a deictic gesture directed at F003 and indicated by the pronoun "you", it also creates a moment of shared knowledge given that F004 states that her addressee knows the people she is talking about. Thus, the

IFE-G articulated by F004 serves the interaction in the sense that, in addition to making a direct reference to her interlocutor, the gesture indicates that common ground has been established between speaker and addressee: F003 knows whom F004 is talking about. As the IFE-G is produced along with the verbal utterance "you know them", the addressee (F003) directly responds to F004 in order to show her following by nodding twice as "to further strengthen mutual understanding" (Jokinen, 2010, p. 39).

6.3.2.3 Discourse planning through IFE-Gs

As argued previously, planning discourse segments (more specifically, in the context of word searching) is not simply an activity managed by the main speaker alone, but it can also be used as part of an interactively designed activity which the addressee can recognize and also take part in (Goodwin & Goodwin, 1986). Moreover, in addition to features of talk being important in the consideration of word searches (e.g., hesitation markers and filled pauses), Goodwin and Goodwin argued for the equal importance and relevance of other gestural strategies including gaze, and facial and gestural expressions.

The sequence below is an illustration of these features at work during a word search activity between the primary speaker, C004, and her granddaughter, acting as the main addressee. In the current context, C004 is talking about phone experiences with family members. She tells her granddaughter that one of them speaks very fast on the phone like another one whose name she cannot remember. She has trouble finding her words and, more precisely, she shows some difficulties in finding the name of a family member:

(21) C004: <u>Like euh (.) [IFE-G:R] </u>Guillaume like Guillaume

Addressee: Guillaume

Fig. 69: IFE-G expressing PLAN in CorpAGEst, S2, C004 (05:26.317-05:29.677).

In picture 1, the right arm of C004 is resting on the armchair of the sofa. As she utters the word "like" in picture 2, her arm leaves the initial rest position in the direction of the addressee with the right hand adopting the handshape of an IFE-G. The speaker's gaze is directed at the addressee. As she enters the word search in picture 3, she withdraws her arm and her gaze direction from the addressee, adopting a thinking face (Goodwin & Goodwin, 1986) while saying "euh". By withdrawing her elbow to its rest position and producing the "euh", the speaker shows her addressee that she is unable to find the word she wants. Throughout the entire word search, involving both verbal (speech) and non-verbal (manual and non-manual) components marked by the filled pause "euh" (477 ms) and the gaze and arm retraction, her hand is still maintained in midair position displaying an IFE-G handshape. This can be construed as a way for the speaker to show the addressee that she has not finished speaking but that she simply has difficulties in finding the word she wants.

In picture 4, C004's gaze is directed at the addressee. At the same time, she produces very brief and quick up-down moves of her right hand as if to trigger a response from the addressee to help her in the word search. The combination of the addressed gaze and the up-down repeated moves of her hand within the word search "can solicit not just attentiveness, but active aid in attempting to find the word" from the addressee (Goodwin & Goodwin, 1986, p. 67). The ensuing effect of this combination is a success: the addressee steps in and provides the missing word: "Guillaume", which the speaker immediately acknowledges by repeating the word along with a single accompanying up-down beat gesture in the shape of an IFE-G. Having found the name of the person, the word searching activity is over, her arm goes back to rest position on the armchair, and she resumes speaking.

This sequence illustrates the different ways the IFE-G can be used in an activity such as a word search, which initially did not function to plan speech *per se* but rather to mark common ground by referring to a person the addressee already knew. Still, the speaker keeps the hand configuration and shape of the extended index finger throughout the entire activity. All in all, this example has shown how a word search activity "might encompass a range of different types of participation, and how the pattern of co-participation found at a particular point might be achieved and negotiated as the search unfolds through a systematic process of interaction between searcher and recipient" (Goodwin & Goodwin, 1986, p. 70).

6.3.3 Summary of main findings for [INT] IFE-G in LSFB & BF

Two questions were tackled in the previous sections as to the interactive potential of IFE-Gs in LSFB and BF: (1) how frequent are IFE-Gs in LSFB *vs.* BF? And (2) for what kinds of interactive purposes are they used? Analyses yielded interesting results. In the LSFB dataset, a total of 63 tokens of INT IFE-Gs out of 783 tokens were found, which represent 8% of all IFE-G cases in LSFB, while 78 tokens of INT IFE-Gs (28%) were found for BF (CorpAGEst and FRAPé Corpora together). While the main functions of IFE-G in LSFB remain tied to the referential functions of language, there is still a fair number of index gestures that are linked with the organization of signed conversation. Interactive IFE-Gs remain an important component of language use in signed conversation, in which signers mainly deploy the IFE-G to provide feedback and regulate their turns-at-talk. By contrast, speakers mainly use the IFE-G to manipulate the content of the information provided to the addressee or to directly address him/her. These functions are: monitoring the addressee, delivering new or shared information, and seeking help during word searches, which constitutes a distinct category of planning than the planning function as an internal activity.

6.4 Gaze direction combined with interactive IFE-Gs

Similar to the approach adopted in chapter 3 on the PU, this section deals with the analysis of a series of gaze directions produced simultaneously with interactive IFE-Gs in LSFB and BF. Based on the most frequent interactive functions of IFE-Gs, the direction of gaze is explored on two levels. First, different gaze directions co-occurring with all interactive IFE-Gs are quantitatively described within and across corpora and languages, and second, associations between specific gaze directions and interactive functions are analyzed.

6.4.1 Combination of gaze directions and all interactive IFE-Gs

One of the first questions dealt with concerns the variation and/or stability of speakers' and signers' gaze directions when they produce interactive IFE-Gs in conversations. More particularly, the distribution of the different gaze directions co-occurring with interactive IFE-Gs across languages, corpora and participants are reported. Similar to the analysis of PU conducted in chapter 3, each IFE-G token received a gaze-direction label on an independent tier in ELAN. These labels were defined in section 3.3.3 of chapter 2. The following figure brings out the distribution by language to pinpoint the type of direction guiding signers' and speakers' gazes when they produce interactive IFE-Gs:

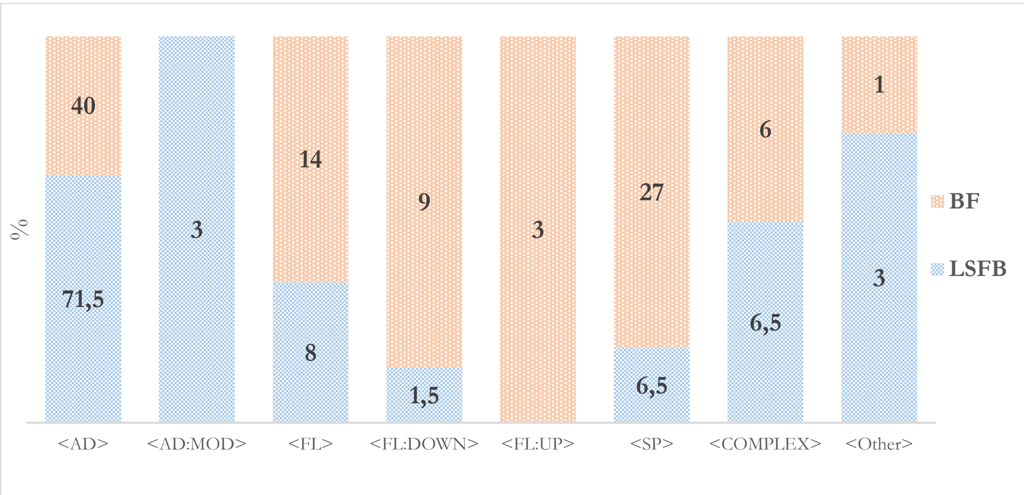


Fig. 70: Distribution in percent of gaze direction types with IFE-Gs by language.

Looking at the different kinds of gaze directions that combine with interactive IFE-Gs in LSFB and BF, it appears that the main category in both languages is a gaze addressed to the addressee when an interactive IFE-G is performed. Yet, this category of <AD> gaze is more important in LSFB than in BF (71.5% *vs.* 40%, respectively). Then, floating gazes "<FL>" (including variants of upward and downward gaze directions) and those that are directed at some point in space "<SP>" represent the other most frequent categories accompanying interactive IFE-Gs. There are, however, more floating gazes (<FL>) in BF (14%) than in LSFB (9%). The same holds true for floating variants, which include 9% of floating down and 3% of floating upward gazes in BF *vs.* 1.5% for <FL:DOWN> and none for <FL:UP> in LSFB. This type of finding can be linked with the proportion of IFE-Gs carrying a planning function ([PLAN] IFE-Gs). Indeed, there were more planning IFE-Gs found in the discourse of BF speakers (20.5%) than in the discourse of LSFB signers (6.5%). It is therefore likely that a relationship exists between the function of planning and gaze direction (viz., floating) at the moment of gestural production.

As regards the distribution of the <SP> gaze direction, that is, aimed at a point in space, this category is more prominent in BF than in LSFB (27% *vs.* 6.5%, respectively). <COMPLEX> gazes are almost equally distributed in both languages (6% in BF *vs.* 6.5% in LSFB), which indicates that signers and speakers do not indistinguishably change gaze directions during IFE-G production. Lastly, there is a greater degree of intra-variation in LSFB than in BF. Fig. 71 displays a greater gap difference between the different categories within LSFB (71.5% of <AD>, 8% of <FL>, 1.5% of <FL:DOWN>, 6.5% of <SP>, 6.5% of <COMPLEX>, and lastly, 3% of <Other>) than within BF where the differences between categories, although existing, are less significant (40% of <AD>, 14% of <FL>, 9% and 3% of <FL:UP> and <FL:DOWN, respectively; 27% of <SP>, 6% of <COMPLEX>, and 1% of <Other>).

How the different gaze directions with INT IFE-Gs combine across corpora is investigated next to unveil the differences (or lack of) between the CorpAGEst and FRAPé datasets, and LSFB. The figure below brings out the distribution by corpus:

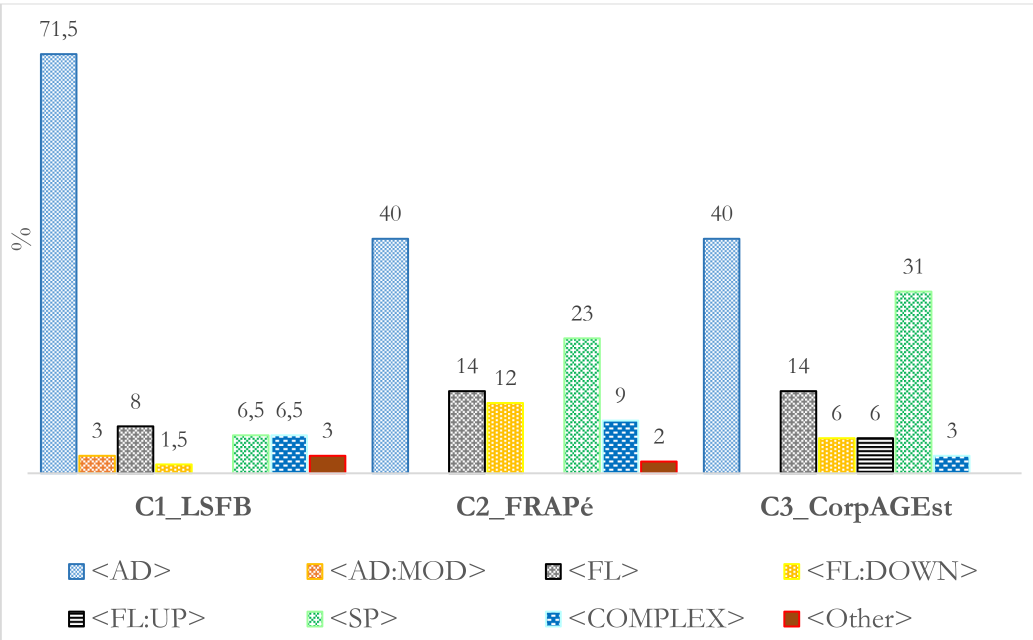


Fig. 71: Distribution in percent of gaze directions with interactive IFE-Gs by corpus.

Fig. 71 brings to the fore interesting aspects of gaze directions accompanying interactive IFE-Gs in the three corpora: LSFB, FRAPé, and CorpAGEst. First of all, there is a compelling consistency between the two spoken BF multimodal corpora. Intriguingly, BF speakers – regardless of the conditions under which they were interviewed (i.e., tasks, addressee, or setting) – deploy a similar repertoire of gaze directions with interactive IFE-Gs found in their conversations. The only slight particularities standing out between both corpora concern the following categories:

<SP> (23% in FRAPé *vs.* 31% in CorpAGEst) and <COMPLEX> (9% in FRAPé *vs.* 3% in CorpAGEst), thereby indicating that CorpAGEst speakers direct their gaze at some point in space more than FRAPé speakers do, while FRAPé speakers change target more frequently when producing interactive IFE-Gs. As far as the other distributions are concerned, the results are interestingly similar for the following categories: addressed <AD> (40%), floating <FL> (14%), and when considering the floating variants under the same category of regular floating gazes (viz., <FL:UP> and <FL:DOWN> combined), the percentage is the same as well (12%) in BF.

Regarding gaze distribution by participant, the results are not dealt with in a detailed fashion. The reason for this is that participants' scores for the number of interactive IFE-Gs produced are highly heterogeneous. For instance, in CorpAGEst, only one speaker stood out (C004), who produced 31 interactive IFE-Gs compared to the other three participants (C001 with 2 tokens, and C002 and C003 with 1 token each). Table 21 below illustrates this and provides the number of gaze direction tokens accompanying interactive IFE-Gs by participant:

Gaze Category	C001	C002	C003	C004	F001	F002	F003	F004	S001	S002	S003	S004
<AD>	1	0	1	12	3	2	2	10	21	1	19	4
<AD:MOD>	0	0	0	0	0	0	0	0	0	0	0	1
<FL>	1	0	0	4	0	1	2	3	1	2	0	2
<FL:DOWN>	0	0	0	2	2	0	1	2	0	0	1	0
<FL:UP>	0	0	0	2	0	0	0	0	0	0	0	0
<SP>	0	0	0	10	1	0	4	5	0	1	0	3
<COMPLEX>	0	1	0	1	1	0	3	0	1	1	2	1
<Other>	0	0	0	0	0	0	0	1	0	0	0	2
Total INT IFE-Gs	2	1	1	31	7	3	12	21	23	5	22	13

Table 21: Individual description of gaze direction co-occurring with interactive IFE-GS in percent.

Nevertheless, commenting qualitatively on the participants who produced the most interactive IFE-Gs (viz., C004, F004, S001 and S003), two elements stand out. First, almost all gaze directions are directed at the addressee (especially in LSFB). Second, gaze directions seem more varied in BF – where more gaze categories are used – than in LSFB when interactive IFE-Gs are produced. Yet, these results do not indicate what kinds of gaze directions combine with specific interactive functions nor whether they are similar or not between BF speakers and LSFB signers. Therefore, the next section tackles this issue.

6.4.2 Combination of gaze directions with specific interactive functions

The previous sections dealt with the overall use of gaze directions with interactive IFE-Gs regardless of the actual function served by the gesture in signers' and speakers' interactions. In the following lines, the different gaze directions associated with the most frequent interactive functions in both languages, LSFB and BF, are introduced. As discussed in chapter 3 for PUS, the results below are only reported for the functions of IFE-Gs that brought out interesting contrastive findings between both languages in sections 6.3.1 for LSFB and 6.3.2 for BF. These functions included the management of turn-taking in signed conversation (turn-at-talk, in LSFB), the delivery of shared information (common ground, in BF), seeking *vs.* showing agreement and following (monitoring in BF and agreeing in LSFB), and planning discourse segments (in LSFB and BF).

6.4.2.1 Gazing while managing turn-at-talk in LSFB

An important use attributed to IFE-G in LSFB was the regulation of turn-taking (e.g., for opening, giving, holding, and closing turns). In the LSFB corpus, the entire repertoire of turn regulating functions represented 36.5% of all IFE-Gs produced. Hence, what are the most frequent gaze directions associated with IFE-Gs expressing this kind of function in LSFB? Are they the same when signers open, hold, give or close a turn?

Turn-opening IFE-Gs are mainly directed at the addressee (8 tokens/15, 53%) when the primary signer begins his/her turn. The same holds true for the other turn-taking functions, such as turn closing (1 token in total), giving (2 in total), and suspending (3 out of 4 tokens). There is, however, a greater variation in the gaze directions for opening turns by signers than there is for the other types of functions managing turn-at-talk. Indeed, signers seem to change their gaze targets (20%) and look at a point in space (13%) more often when opening their turn than when closing, giving or suspending it. All in all, it can be said that the gaze direction activated during the articulation of IFE-Gs expressing a turn-taking function is relatively stable and characterized by an addressed gaze.

Funct-C in %	<AD>	<MOD>	<FL>	<FL:DOWN>	<FL:UP>	<SP>	<COMPLEX>	<Other>
OPEN_LSFB	53	7	0	0	0	13	20	7
CLOSE_LSFB	100	0	0	0	0	0	0	0
GIVE_LSFB	100	0	0	0	0	0	0	0
SUSP_LSFB	75	0	0	25	0	0	0	0

Table 22: Distribution in percent of gaze directions related to TURN-TAKING IFE-Gs.

6.4.2.2 Gazing during the delivery of shared information in BF

One of the most frequent interactive functions of IFE-Gs that was found in the discourse of BF speakers was the expression of common ground (COGR), or shared knowledge, between participants. The table below brings out the percentage of the different gaze directions that co-occur with these IFE-Gs in BF:

Funct-C in %	<AD>	<AD:MOD>	<FL>	<FL:DOWN>	<FL:UP>	<SP>	<COMPLEX>
COGR_BF	65	0	0	7	0	7	21

Table 23: Distribution in percent of gaze directions related to COGR IFE-Gs.

Unsurprisingly, an <AD> gaze toward the addressee characterizes the main direction accompanying this function. Given that the main aim of this function is to establish a connection between both participants as regards the status of the information transmitted by the primary speaker to his/her addressee, the gaze is usually directly addressed in order to establish this common ground between them. In addition to this main gaze direction, there are also a fair number of changes in the gaze target (<COMPLEX>) (21%) during that type of IFE-G, but at some point they all include an <AD> gaze aimed at the conversational partner. Other less prominent directions include 7% of both vague <FL> and spatially directed <SP> gazes during COGR IFE-Gs in the BF corpora.

6.4.2.3 Gazing while seeking (MONI) vs. expressing (AGR) agreement and following in LSFB and BF

The following table displays the results for two types of interactive functions, namely, monitoring in BF and agreeing in LSFB. The general idea of monitoring gestures is to check the addressee's reaction (performed by the primary signer/speaker), while the general idea of agreeing gestures is for the addressee to show or express understanding (viz., agreement) and following to the main speaker/signer. In the results section, the majority of monitoring IFE-Gs were found in BF while most agreeing IFE-Gs were found in LSFB. Therefore, the results as regards co-occurring gaze direction are structured according to these types of functions present in each language.

In BF, monitoring IFE-Gs are mainly expressed with a gaze addressed to the main addressee (39%) *vs.* 25% of <COMPLEX> and 22% of <SP> gaze directions when seeking following and/or attention. Fewer IFE-Gs are characterized by vague gazes for this function in BF (7% for <FL> and <FL:DOWN>). In LSFB, results are relatively unanimous: 93% of agreeing IFE-Gs have a gaze directed at the main signer in the interaction as a way to provide feedback; almost no other gaze directions characterize this function:

Funct-C in %	<AD>	<AD:MOD>	<FL>	<FL:DOWN>	<FL:UP>	<SP>	<COMPLEX>
MONI_BF	39	0	7	7	0	22	25
							<CL>
AGR_LSFB	93	0	0	0	0	3.5	3.5

Table 24: Distribution in percent of gaze directions with MONI in BF and AGR in LSFB.

6.4.2.4 Gazing while planning in LSFB and BF

Lastly, a common function frequently used by speakers and signers was planning. Most planning IFE-Gs have a floating gaze direction when speakers and signers produce them (50% in BF *vs.* 80% in LSFB). Only speakers, however, display a floating down and up type of gaze (11% <FL:DOWN> and 5.5% <FL:UP>). These results concur with the claim formulated in section 6.4.1. There is a link between floating types of gaze directions and the planning function of language. Additionally, solely 17% of gazes in BF are directed at the addressee, suggesting that these 17% occur when the speaker seeks help from the addressee during a word search while the vague directions are used when speakers and signers refocus on themselves to plan their discourse and/or find their words. There are also more changes in gaze directions <COMPLEX> taking place during planning IFE-Gs in signers' discourse than in BF (20% *vs.* 11%, respectively). Lastly, a small proportion of closed eye gazes <CL> were noted in BF (5.5%).

Funct-C/ in %	<AD>	<FL>	<FL:DOWN>	<FL:UP>	<SP>	<COMPLEX>	<CL>
PLAN_LSFB	0	80	0	0	0	20	0
PLAN_BF	17	50	11	5.5	0	11	5.5

Table 25: Distribution in percent of gaze directions with PLAN IFE-Gs in LSFB and BF.

6.4.3 Summary of the accompanying gaze directions

In a similar vein to the results presented in chapter 3 (section 6.4), this part aimed at describing gaze direction patterns during the production of interactive IFE-Gs in the discourse of LSFB signers and BF speakers, on the one hand, and their association with specific interactive functions, on the other. The results obtained for these two axes are hereafter summarized.

As regards the first axis, the different gaze directions combined with all interactive IFE-Gs unveiled some similarities and differences between LSFB and BF. First of all, regardless of the language, the main gaze category characterizing interactive IFE-Gs is the <AD> direction. These results are followed by the <FL> and <SP> categories, with 8% of <FL> in LSFB *vs.* 14% in BF, and 6.5% of <SP> in LSFB *vs.* 27% in BF. A similar percentage of gaze shifts during interactive IFE-Gs were observed in both languages (6% in BF and 6.5% in LSFB). There were, however, more floating kinds of gazes in BF than in LSFB. This finding was corroborated by the greater number of planning IFE-Gs found in BF than in LSFB.

The results by corpus revealed a stable usage of gaze directions with interactive IFE-Gs in BF (dissociating CorpAGEst's results from FRAPé's). Interestingly, similar percentages were found for the following gaze direction patterns: <AD> and <FL>. The only differences were found for <SP> and <COMPLEX>. CorpAGEst speakers looked more commonly at a particular point in space than FRAPé speakers and LSFB signers did. By contrast, FRAPé speakers made more changes in their gaze direction during the articulation of interactive IFE-Gs than CorpAGEst speakers and LSFB signers did.

Focusing on the second axis of the analysis tackling gaze directions with specific interactive functions of IFE-Gs, results revealed that, for the most part, all the most frequent interactive functions of IFE-Gs found in the discourse of signers and speakers – identified in section 6.3 – were primarily accompanied by an <AD> gaze direction. The only exception concerned the planning function of language, in which the IFE-Gs performed during moments of cognitive effort in processing speech were characterized by floating kinds of gazes while an <AD> gaze accompanied a planning IFE-G when the speaker was seeking help from the addressee during a word search.

6.5 Summary of the results

In this chapter, three types of results were presented: (1) the distributions of IFE-Gs in LSFB and BF, (2) the discourse functions served by IFE-Gs with an emphasis on the interactive roles of these index finger moves, and (3) the association of these IFE-Gs with different gaze directions. The main results are hereafter summarized.

First, what resulted from the analysis conducted on IFE-Gs across languages, corpora, and participants? In total, 1057 IFE-G tokens were found in all the data, out of which 783 were produced by LSFB signers (74%) and 274 tokens were articulated by BF speakers (FRAPé and CorpAGEst), amounting to 26%. The results highlighted a statistically significant difference between both languages as regards the average number of IFE-Gs produced per 100 tokens, suggesting that when signers and speakers are compared, LSFB signers make significantly more IFE-Gs than BF speakers. When distinguishing within BF (FRAPé *vs.* CorpAGEst participants), slightly more IFE-Gs were found in the discourse of FRAPé speakers. The Kruskal-Wallis test indicated a statistically significant difference between the three corpora ($p = 0.018$). The non-parametric Mann Whitney test also showed a significant difference between LSFB and FRAPé, and LSFB and CorpAGEst while no statistically significant difference was further established between CorpAGEst and FRAPé. This finding sheds light on the fact that there seems to be a role played by language modality (signed *vs.* spoken) in the production of IFE-Gs. As for individual use, LSFB signers are those who articulated the most IFE-Gs, with S001 and S002 producing 12 and 11 IFE-Gs/100 signs, respectively, while S003 and S004, the other dyad, performed 7.5 and 7.3 IFE-Gs/100 signs. In BF, the results were more heterogeneous. FRAPé speakers made between 2 IFE-Gs/100 words (F004, 1 IFE-G every 10 strokes) and 1 IFE-G/100 words (F001, 1 IFE-G every 8 strokes and F003, 1 IFE-G every 14 strokes) to almost no IFE-Gs at all (F002), while in CorpAGEst, only one speaker (C004) stood out with 7.1 IFE-Gs/100 words or 1 IFE-G every 3 strokes. C004's production of IFE-Gs is similar to that of signers S003 and S004. The rest of the dataset barely produced any IFE-Gs.

Before dealing with the roles of IFE-Gs in the discourse of signers and speakers, hand preference and handedness were examined. The results revealed that 93.5% of IFE-Gs in LSFB were one-handed (*vs.* 6.5% of two-handed forms). Additionally, signers also clearly preferred to use their dominant hand (viz., right). An interesting aspect observed in the results for hand preference was a greater inter-dyad variation (between dyads) than intra-dyad variation (within dyads). For two-handed IFE-Gs, S001 and S002 produced about 10% while S003 and S004 articulated between 2% and 3%. For IFE:G-R, S001 and S002 are in the 80th percentile of IFE-Gs produced *vs.* more than 90% for S003 and S004. Lastly, for IFE-G:L, 4% to 6% were produced by S001 and S002 while only 1% was produced by S003 and S004. As for BF speakers, although more one-handed IFE-Gs were used, results depicted a greater heterogeneous picture for both hand preference and handedness.

Secondly, for what kinds of discourse functions were IFE-Gs used? The second part of the analyses conducted on IFE-Gs in LSFB and BF focused on the functions of IFE-G, with an emphasis on its interactive roles. The results for the different types of functions served by the IFE-G in the LSFB dataset concurred with what the scientific literature usually reports on pointing in SLs: most IFE-Gs in LSFB served a pronominal, locative and determinative function. Nevertheless, 8% of all IFE-Gs carried an interactive function (63/783 tokens). In both BF corpora, out of the 274 IFE-G tokens, 78 were interactive, representing 28.5% of all IFE-Gs in BF, with 43 tokens out of 170 in FRAPé (25%) and 35 tokens out of 104 in CorpAGEst (34%). As for the individual production of interactive IFE-Gs, inter- as well as intra-individual variations were characteristic of each corpus. In LSFB, there was a greater intra-individual variation in the first dyad between S001 (35%, 22 tokens) and S002 (8%, 5 tokens) than between S003 and S004, who produced 36.5% (23 tokens) and 20.5% (13 tokens), respectively. In FRAPé, in each dyad, one speaker produced twice as many interactive IFE-Gs than their conversational partner. Similarly, the dyad composed of F003 (28%, 12 tokens) and F004 (49%, 21 tokens) produced more IFE-Gs than the other one made up of F001 (16%, 7 tokens) and F002 (7%, 3 tokens). Finally, in CorpAGEst, only one speaker, C004, stood out for producing 88% of all interactive IFE-Gs, highlighting a great intra-individual variation in the corpus.

Thirdly, for what kind of interactive purposes were IFE-Gs used? The primary interactive functions of IFE-Gs used by signers in LSFB were to provide feedback (showing agreement and following, 43%) and to regulate the turn-taking system (for opening, suspending, giving, and closing one's turn, 36.5%). There were also a fair number of IFE-G tokens used to seek understanding and attention (viz., monitoring) and to plan upcoming discourse segments (viz.. planning) but signers rarely used the IFE-G to deliver new and shared information to their addressee. In BF, the most frequent uses of IFE-G for interactive purposes were to seek following and agreement (monitoring), to express shared knowledge, and to show they were thinking about what to say (planning). Very subtle differences between the two BF corpora concerned the delivery of new information, which was more present in CorpAGEst, as opposed to the agreeing function, which was only identified in FRAPé. All in all, the interactive nature of the uses of the IFE-Gs by speakers and signers was different. In BF, speakers produced IFE-Gs to manipulate or convey the content of the information directed at their conversational partner, while LSFB signers made use of the IFE-G for interactive purposes in a sense that was more related to the structure of their discourse, especially for managing their turn-taking system and for providing feedback. All of these results concerning the most frequent interactive functions in each corpus are summarized in a table in the appendix, along with the other two gestural markers, the PU and holds.

Lastly, gaze direction was explored on two levels of analysis between LSFB and BF: (1) gaze directions co-occurring with interactive IFE-Gs, and (2) the combination of gaze directions with specific interactive functions. Some similarities and differences were established between both languages. Although more important in LSFB than in BF, the primary gaze category accompanying interactive IFE-Gs in both languages was an addressed <AD> direction (71.5% *vs.* 40%). More spatial (<SP>) and floating (<FL>) gazes were observed in BF than in LSFB, while the same percentage of gaze directions was found for gaze shifts (<COMPLEX>) in both languages (6%). FRAPé and CorpAGEst shared a number of gaze features as regards the following categories: <AD> and <FL>. The only difference between BF corpora was that CorpAGEst speakers looked at a particular point in space more frequently than FRAPé speakers and LSFB signers did. By contrast, FRAPé speakers performed more gaze shifts during the articulation of interactive IFE-Gs than CorpAGEst and LSFB participants did.

Allow me to offer some tentative explanations. The results presented above may be interpreted in the light of different factors influencing SL systems. Despite the focus of the present research on the interactional mechanisms at work behind IFE-Gs, it remains hard to overlook the linguistic weight on those forms in SL compared to the less grounded nature of such forms within the linguistic system of SpL. As pointed out by Fenlon and colleagues (2019), the form of IFE-G is more stable and consistent across uses in SL than in SpL. This finding was confirmed for hand preference and handedness in LSFB and BF, revealing that this form is more constrained linguistically in SL than in SpL. However, other forces might be at work that would explain the results obtained. One of the possibilities accounting for the different uses of IFE-Gs in LSFB and BF is the fact that IFE-Gs in LSFB are produced alongside the main stream of sign production. In other words, the same articulatory means are used to articulate IFE-Gs and the rest of the referential content: the signer's hands. However, this is not the case for speakers in SpLs as some part of the referential content may be expressed by speech. This fact may account for the differences observed between the main uses of the IFE-G for interactive purposes. As mentioned, one of the main differences was that the interactive roles of IFE-Gs were more linked to the manipulation of the content of the information in BF (viz., introducing new *vs.* shared knowledge and seeking following from the addressee) than those in LSFB, which were linked to the structure of the interaction itself (viz., for turn taking and feedback).

Thus, as a result, IFE-Gs in SL are less prone to be simultaneously produced in support of the information delivered to the addressee (e.g., to express new information) given the relatively short span available to signers for this purpose. Conversely, this does not apply to speakers in gesture and speech.

7 Preliminary Conclusions

This chapter aimed at comparing uses of index finger-extended gestures in two languages in Belgium, namely, LSFB and BF. It has been argued that these types of manual movements, which distinguish themselves by a protruding index finger, are not only used for referential purposes but also to regulate the flow of interaction and manage the speaker-signer/addressee relationship, and that therefore such uses should be part of language theory.

From the beginning, the index shape has presented a challenge regarding its analysis in a SL *vs.* a SpL. As a result, a motivated choice was made to use a more neutral term because of the notion behind the appellation of IFE-G alluding to pointing. The aim was to tackle this phenomenon occurring in LSFB and BF in more neutral terms given the linguistic status ascribed to pointing in SL. Indeed, the protruding index has often been the central prototype used for pointing purposes around the world. Such a canonical prototype, which "comes complete with prototypical semiotic properties, a prototypical form, and prototypical functions […] is not by any means a myth" (Cooperrider, 2014, p. 15) but, as such, has hidden some other underlying particularities entailed by this manual form, including a wider range of its functions. This study challenged the prototypical functions usually seen as being carried out by index extended gestures and, by extension, pointing by focusing on peripheral types and functions of IFE-Gs. This study has shown that by taking a different stance from that which is usually adopted in linguistics – the primary focus being on the referential meaning of IFE-G – it is found that individuals do not only use the IFE-G to index referents but also to direct attention to salient parts of their interaction and manage the dialogical flow between the participants in a conversation.

These moments of interaction management performed by IFE-Gs were at the center of this chapter. The data has revealed several uses of IFE-Gs in both languages linked to functions that aim to regulate dialogue and coordinate the conversational flow of information rather than conveying "purely referential meaning" (Jokinen, 2010, p. 48). These functions work at the metalevel of language (Kendon, 2004) by drawing the addressee's attention to a salient point in the discourse, by creating shared understanding, and fostering social bonds between conversational partners. It is not argued, though, that the IFE-G has a monopoly on representing all these interactive functions. As seen previously, other types of manual gestures (e.g., the PU) as well as non-manual features (e.g., head nods, see Puupponen, 2019) can express a similar range of functions in signed and spoken conversations. Hence, the functions surveyed in the present analysis of IFE-Gs do not constitute an exhaustive breakdown of the wide range of functional possibilities that bodily behaviors may entail in discourse.

Following up on other researchers' claims and in light of the present findings in which interactive IFE-Gs amounted to 8% in LSFB and 28.5% in BF, these IFE-Gs represent a paramount feature of language, across speaking and signing communities. Therefore, language theory should account for such a phenomenon as "language does not happen solely in the mind of a speaker [or signer], but it is used to act and react out in the world, and theory should reflect this use" (Ferrara, under rev., p. 36). The present study has brought further support and evidence for such inclusion. These bodily behaviors of interaction need to be integrated by scholars working in the fields of sign language, gesture, and linguistics.

Ultimately, this work has contributed to the current debate as regards gesture position in relation to SpLs and SLs by presenting a preliminary description of interactive uses of IFE-Gs as part of the composite utterances deployed by LSFB signers and BF speakers. Within the semiotic framework developed throughout this dissertation, the consideration of IFE-Gs as interactive practices in LSFB and BF has opened the way for re-evaluating the gesture-sign paradigm between what is part of language (linguistic) and what is not (gestural), on the one hand, and whether such division between sign and gesture is "an artefact of a misconception about 'gesture'" (Kendon, 2008, as cited in Johnston, 2013b, p. 133), on the other. In widening the functional range of IFE-Gs' roles in signed and spoken discourse, the present study has revealed the potential of such actions to be seen for more than their referential purposes in speakers' and signers' language use in conversation, opening new avenues for future research involving more languages to be compared, including SLs and SpLs.

CHAPTER 5
When Hands Stop Moving, Interaction Keeps Going
A STUDY OF HOLDS IN THE MANAGEMENT OF LSFB AND BF INTERACTIONS

When someone moves, you perceive it as more than a change of place or change in the mover's body shape. Movement does not flow along in a monotone - you see [...] quick flashes, impacts, changes in focus, suspension, pressures, flutterings, vigorous swings, explosions of power, quiet undulations. All this variety is determined by the way in which the mover concentrates his exertion or effort, [which] may be concentrated in the changes in the quality of the tension, or the flow of movement; the quality of the weight, or the quality of time in the movement; or it may be concentrated in the mover's focus in space
(Dell, 1970, p.11 about dance)

The anatomical structure of a gesture and sign can be decomposed into a stream of manual phases unfolding in time and space in front of the speakers/signers' body. There are occasions, however, when this manual stream is suspended. The present chapter focuses on such moments in signed (LSFB) and spoken (BF) interactions when manual production (viz., of the handshape, location, and orientation) is frozen. Holds have mostly been examined in SLs in relation to prosody, delimitation of syntactic frontiers, and to corresponding vowel lengthening phenomena in SpLs. In gesture research, they have been overlooked for not sustaining any linguistic information on their own. Yet, some scholars have argued for their non-arbitrary and recurrent role in social interaction. This chapter explores holds as potential meaning-making practices used by LSFB and BF individuals, and more particularly, their roles in the management of social interaction within and across languages. The objectives are to analyze: (1) their frequencies; (2) their interactive functions; and (3) co-occurring gaze directions.

After a state of the art of holds in the field of SL linguistics and gesture studies (section 1), some methodological issues raised during the annotation process are outlined (section 2). Section 3 will present the analyses conducted and the results. The last section is devoted to summarizing the main findings and discussing the chief contributions to the approach adopted in this chapter, viz., examine holds from an interactive perspective.

1 Review of the Literature on Holds

This section first provides an overview of the literature on the usual characterization of holds based on their formal aspect as tackled by researchers from the fields of gesture studies and SL research. Next, to understand the current approach, specific studies devoted to the interactional implications of holds in spoken and signed language interaction are brought to the fore.

1.1 Holds in gesture and sign

The way holds have been considered in spoken and signed language research is the object of the present section. In particular, Kita and colleagues' (1998) study is taken as a point of departure for these authors provide a comprehensive account of all movement phases that structure gesture and sign.

How are holds described in SpL and SL research? It has been demonstrated in previous work that when a speaker or signer articulates a specific move, the manual movement in question – from the beginning to its end – is to be conceived in terms of temporality. Temporality in the sense that a series of distinct phases displaying different dynamic characteristics come to describe the movement being performed. In other words, this temporal and spatial succession of phases "from the beginning of preparation to the end of retraction, describes the lifetime of a particular gesture" (McNeill, 2006, p. 303) and sign. The concept of manual phases has been described extensively (e.g., Bressem & Ladewig, 2011; Kendon, 2004; Kita et al., 1998; McNeill, 2005). The following description of the basic types of phases constituting the structure of a sign/gesture primarily deal with the forms that these phases entail and not the functions they serve at this point (see sections 1.3 and 1.4, this chapter). A first example is introduced in Fig. 72 below for SL first, and gesture next, in LSFB and BF. The respective phases forming the manual excursion in both figures are explained next.

The signer (S001) in Fig. 72 articulates the sign for RIGHT in the LSFB Corpus:

Rest **Preparation** **Stroke RIGHT** **Post-Stroke Hold** **Retraction**

Fig. 72: Illustration of a post-stroke hold in LSFB, Task 18, S001 (1:12-1:14.483).

As displayed from the articulation of the sign RIGHT, the sign produced is segmented into distinct phases that come to structure the sign in itself. In picture 1, both of her hands are resting on the chair and her eye gaze is away from her addressee but as soon as she wishes to address S002, her hands leave simultaneously their rest position to reach the correct starting position in space of the expressive phase of the lexical sign RIGHT (pictures 2-3). Then, as the signer's hands reach the right location in space and display the appropriate handshape and orientation to produce the sign RIGHT (picture

3), the stroke occurs in picture 4 where both hands are accompanied by a slight downward move that bring both hands in front of her chest. Following the stroke, S001 is going to hold both of her hands for 377 ms in the exact same location in space, manual orientation and handshape of the sign RIGHT. In such a case, the hold is described as a dependent hold "parasitic to the stroke" (Kita et al., 1998, p. 27). In the present example, the hold is then released once the addressee has provided the primary signer (S001) with the appropriate feedback expression of a head nod as a way to show her agreement. Once S001 has received such a confirmation by S002 that what she was transmitting has been correctly acknowledged, her hands retract themselves not to reach the initial rest position but to rest in the neutral space in front of her chest (picture 5). This retraction phase is immediately followed by self-adaptor moves.

A similar succession of phases takes place in the example below drawn from the CorpAGEst Corpus. In this instance, the speaker (C003) is talking about her past work experience (S2) and how her boss used to bring them, her and her colleague, daffodils he would put in a "big rectangular basket":

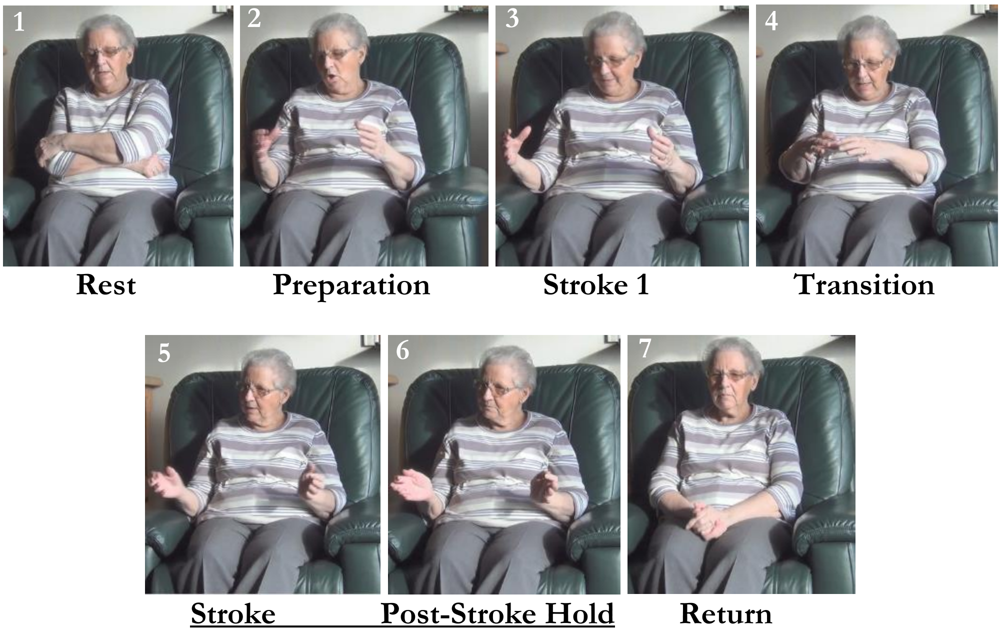


Fig. 73: Illustration of a post-stroke hold in CorpAGEst, S2, C003 (1:12-1:14.483).

As she utters the following words: "there was", her hands leave their rest position (pictures 1-2) to be brought to the initial starting place of the stroke (picture 3). Co-occurring with the word "basket", her hands perform an iconic gesture representing the size and shape of a big basket (picture 3). In picture 4, a transition between two strokes takes place: from stroke 1 referring to the big basket to a second stroke that refers to the shape of the basket itself. As she says "rectangular", both of her hands trace the shape of a rectangular basket. In picture 6, both hands remain on hold for 426 ms before going back to rest position on her lap (picture 7). In this example, the post-stroke hold synchronizes itself with the last co-expressive part of C003's speech of the French word: "rectangulai**re**" (English: rectangula**r**). Once the last portion of speech has been said, her hands go back to rest. Such an example concurs with the traditional function usually associated with post-stroke holds that tend to synchronize with the "co-expressive portion of speech", and to make sure that the expressive phase remains "semantically active" over time (McNeill, 2006, p.303).

Now that two main examples have been introduced to illustrate how holds form part of the signing and gestural stream articulated by speakers and signers, the different kinds of phases that structure a gesture/sign are properly defined next based primarily on the accounts given by Kita and colleagues (1998), Kendon (2004), and McNeill (2006).

A first important point to make is the distinction between gesture unit, gesture phrase and gesture phase. A gesture unit (or G-Unit) is, in broad terms, "the interval between successive rests of the limbs" (McNeill, 2006, p. 302). In other words, it is initiated when the body part in question starts moving and ends when it goes back to rest again on the lap (as in Fig. 73) or the armrest of a sofa, for instance. Any G-Unit may include one or more gesture phrases (Bressem & Ladewig, 2011). A gesture phrase (with an 'r') takes place within a G-Unit and is what we intuitively refer to when we think of a gesture, that is, "a unit of visible bodily action" (Kendon, 2004, p.108). The gesture, in turn, is composed of a sequence of distinct gesture phases (without 'r') including: preparation, stroke, hold, retraction (or return) (Kita et al. 1998, p. 28). Kita and colleagues, unlike Kendon and McNeill, add that a given gesture phrase may be devoid of any stroke (see definition below) but it must at least contain an independent hold that acts as an expressive phase on its own (opposed to dependent holds*,* which are parasitic to the stroke, see below). Other phases were added by other researchers, including a phase called "recoil" (Ferré, 2012) and pre- and post-stroke holds.

❖ **Preparation**. This phase is not mandatory. It occurs when the manual articulator starts with a liberating movement in which the hands start moving away from the body, a location preparation and hand internal preparation when the hands are brought in position for the expressive phase (either a stroke or an independent hold) to be produced (Kita et al., 1998, p. 31). In other words, "the onset of preparation shows the moment at which the visuospatial content of the gesture starts to take form" (McNeill, 2006, p. 302) in the sense that the hand(s) move(s) away from their rest position to reach the adequate location in space, orientation and handshape to perform a given sign/gesture.

❖ **Expressive phase**. As opposed to the previous phase, this one is compulsory as in case of its absence, no gesture/sign is reported to occur. It is that "moment by which the movement reaches its apex and is best defined" (Bohle, 2014, p. 1361). As mentioned, the expressive phase can be performed either by an independent hold or a stroke followed or preceded by a dependent hold: "In an independent hold and a stroke, the form of the body movement is associated with the information to be conveyed" (Kita et al., 1998, p.28). Briefly, The stroke is considered the central and expressive phase of a gestural excursion, carried out with shape and effort, and it is commonly, though not necessarily, related to or operating on some part of a spoken utterance (Kendon 2004)" (Cibulka, 2015, p. 4).

Dependent holds are parasitic to the stroke (Kita et al., 1998). They refer to the momentary suspension of motion occurring either before the stroke (viz., pre-stroke hold) or after (viz., post-stroke hold) (McNeill, 2006, p. 303). McNeill defines post-stroke holds as moments when "the hand freezes in midair before starting a retraction, thereby maintaining the stroke's final position and posture" (McNeill, 2005, p. 31). Kita (1990) already had noted these two kinds of holds following and/or preceding a stroke and distinguished them based on the function they served. He found that pre-stroke holds tended to co-occur more with cohesive discourse connectors (such as subordinating temporal adverbials, e.g., while, when, as) than post-stroke holds. By contrast, post-stroke holds are more likely to synchronize with the "co-expressive portion of speech", and to make sure that the expressive phase remains semantically active over time (McNeill, 2006, p.303).

Similar to Notarrigo's (2017) study, the present dissertation's framework focuses on dependent holds while independent holds are not the object of study. Independent holds, as said previously, stand on their own and can also be the meaning bearing part of a gesture/sign. This applies to numbers and letters in LSFB, for example. Notwithstanding, as pointed out by Notarrigo (2017), it is possible for independent holds to bear dependent holds, where the hand(s) is/are maintained with the right configuration and location in space for more than 200 ms (see section 2 for the criteria of the identification of holds). Such an example was found in the LSFB Corpus, in which the final letter '**e**' of the fingerspelling of S004's village "Mand**e**" is held during 487 ms:

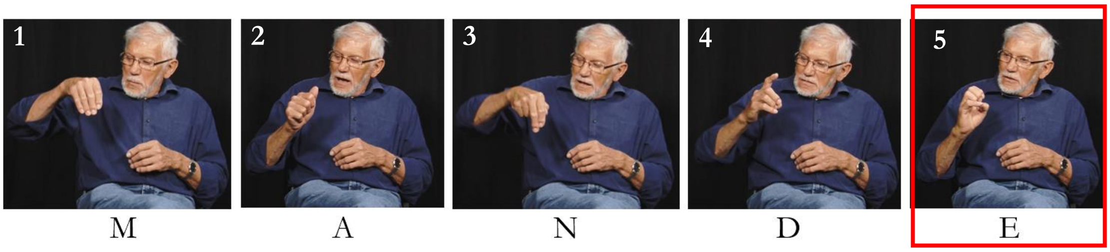


Fig. 74: Illustration of a post-stroke hold in LSFB, Task 03, S004 (03.58.503-04:02.378).

❖ **(Partial-) Retraction ("recovery" or "return",** Kita et al., 1998). Similar to the preparation phase, the retraction phase is optional. Retraction means that the articulator involved in the gestural movement or the signing stream goes back to rest (totally or partially). The fact that the hands return to the state prior to the stroke does not necessarily mean that they go back to the identical position as the one they had at the beginning. As Seyfeddinipur described: "a partial retraction is a movement towards a potential rest position that comes to a halt before it is reached" (2006, p. 109). Similarly, this retraction phase might not happen if a new stroke is following: "When multiple gesticular phrases are concatenated, the recovery can be cut short and becomes a "partial retraction" or completely eliminated" (Kita et al., 1998, p. 29) (e.g., as seen in Fig. 73 above where a transition occurs between two strokes)

❖ **Recoil** ("rebond" in Ferré, 2012) phase corresponds to a slight recoil motion that sometimes happen when the articulator in question goes back during the retraction phase and falls back on the speaker/signer's lap or the armchair of a sofa. As highlighted by Ferré, it is a "pure physiological phase in which the hand is slightly lifted before dropping again" (2012, p. 6).

How are holds defined? As it can been noted from the section above, holds have been acknowledged as part of the anatomical composition of a sign/gesture. However, even their placement within the stream of these distinct manual phases – identified above – during the articulation of a gesture or sign gave rise to different treatment of holds by the scientific community. While the overall idea for the hands to be still in a particular position over a certain lapse of time is shared among scholars, the terms used to define holds vary greatly from one researcher to the next. In order to pave the way toward the definition of holds that will be considered in this work (see section 5), a few definitions are outlined thereafter.

Kita and colleagues (1998) define holds as "a phase, in which the hand is held still [... but] the hand is rarely perfectly still. [...] Sometimes a hold is performed hand internally (e.g., with a distinctive 'active' handshape) at the position that would otherwise be a resting position" (p. 30). In their approach of rethinking gestural phases, Bressem and Ladewig (2011) refer to holds as phases that lack any motion and where the hands "are tensed throughout the execution of the hold, meaning that the hand's configuration is maintained" (p. 74). Similar to Kita et al., the authors authorize hold phases to display some movement during their realization. In a similar vein, Duncan (n.d.) delimits holds based on whether some motion is present or not. As such, she distinguishes between "full hold", viz., no detectable movements and "virtual hold", viz., "some movement but maintenance of hand shape and/or general location in gesture space" (n.d., p. 4). Others, on the other hand, do not establish this distinction and characterize holds when the articulator in question is held in a static position for a certain lapse of time and is different from the rest position (e.g., Cibulka, 2015; Sikveland & Ogden, 2012; Seyfeddinipur, 2006). For these authors, holds correspond to "temporary halt[s] in movement", that is, "momentary suspensions in the midst of gestural excursions, indicat[ing] that the hand momentarily freezes in motion while on the stage" (Cibulka, 2015, p. 4).

These researchers do not provide any information concerning the exact amount of time for the hands to remain "frozen" and therefore for them to be considered as holds. Some scholars, however, do include in their definition the number of frames required for the hands to be called holds. For instance, Ferré (2012) defines a hold as "la phase correspond[ant] à une séquence comprenant au moins deux images sans mouvement de la part du locuteur, mais où les mains sont toujours dans la configuration adoptée pour le geste. Cette phase peut intervenir avant et/ou après la phase de réalisation"[38] (p. 6). For Hansen and Hessmann (2007), holds correspond to a cessation of meaningful hand movements, during which, rather than "moving on to a transition and the next manual sign, sign movement is 'frozen' [...]. [W]e considered a hold to consist of a sequence of at least three consecutive video frames that depict identical or nearly identical hand position" (p. 164). As mentioned by Notarrigo (2017, p. 136), three frames for Hansen and Hessmann correspond to a threshold of 120 ms.

Thus, at first glance, holds seem easy to define. There is a common consensus at least in the scientific community in gesture and SL research that a hold is to be perceived as a phase during which the hand (or both) is held steady for a certain lapse of time. Yet, when dealing with some of the definitions mentioned above, the criteria for defining holds become fuzzy and slightly vary from one researcher to the next.

[38] Translated into English by myself: "The phase correspond[ing] to a sequence that includes at least two frames without movement on the part of the speaker whose hands are still in the previous gestural stroke handshape. This phase can occur prior or after the stroke"

Some researchers accept a slight drop of the hand during a hold phase while others argue for holds to remain tensed throughout the whole execution of the hold and to remain in the exact position and hand configuration as the preceding or following expressive phase. Lastly, some authors consider holds when they occur prior or after the expressive phase, that is, as dependent holds (pre- and post-stroke holds) or as expressive phases on its own, viz., as independent holds.

In the current dissertation, Notarrigo's (2017) decisions concerning methodological issues (such as: when to consider the temporary cessation of movements as holds" or "how long must the hands remain fixed?) are followed and applied. Hence, a threshold of 200 ms was decided for the detection of such holds (see section 2). But then again, the reader can wonder how non-movement phases may play a role in interaction. Cibulka's (2016) work on this issue is revealing. He showed that "such segments […] should be regarded as part of an established interactional practice rather than as failure or incomplete signs [or gestures]" (p. 459). His results show that holds can establish collaboration during repair and word searches, hold a turn, and prompt for a response, among other interactive functions. These kinds of questions are what constitutes the building block of the following sections on holds in spoken and signed interaction.

1.2 Holds in interaction

In the anatomy of sign and gesture, some phases have been ascribed greater consideration compared to others for the role in their participation in the meaning making of the utterance. In particular, there has been a tendency for researchers in the field of gesture studies to devote their attention to what has been described as the meaning bearing part of the expressive phase, viz., the stroke or independent holds. The stroke has often been assumed as the primary expressive component in gesture production. The same holds true for SLs where most researchers have tended to focus on the lexical part of the manual stream in signing. In contrast, the other phases, viz., preparation, retraction, and most importantly, embodied *stasis*, or holds, lack considerable attention and remain largely unexplored.

Yet, some researchers have highlighted the importance of less attended gestural phases in the organizational unfolding of interaction. For instance, McNeill (2005) mentions the status of the retraction phase "especially its end [to be] not without significance", developing his argument further by adding:

> It [the retraction phase] is of interest because it shows the moment at which the meaning of the gesture has been fully discharged. [...] The end of retraction can thus show the full temporal reach of the co-expressive speech with the gesture (p.33).

In a similar vein, Cibulka (2015) examines – in addition to his study on holds (described below) – all transitional locations the hands occupy from the moment they leave their rest position to the moment they are on stage (viz., where the meaningful part of a gesture is produced) and back to the home position (viz., the rest position), and argues for their interactional implications. Thus, he demonstrates that a speaker might indicate "incipient speakership by moving the hands towards the stage" while a speaker with "the hands on stage may signal the upcoming end of speakership by moving the hands towards home" (2015, p. 6), highlighting therefore the interactional roles of other gestural phases, preparation and return, in social interaction. Moreover, return of the hands back to rest has often been linked with sequence closure or action completion in several studies (see Andrén, 2011; Mondada, 2007).

Interestingly, similar interactive patterns for the rest position ("home position", in Cibulka's terms, 2015) have been established. The rest position may be defined as the place where the hands lie when they are not moving, on the speaker's body such as the legs or the armrest of some furniture. Sacks and Schegloff (2002) claim that once a gesture is completed, the manual articulators usually go back to the identical position from which they departed. By contrast, Cibulka (2012) argues that sometimes, the hands may reach another rest position than the one initially assumed prior to the gesture preparation phase:

> It becomes apparent that the position of resting hands is dynamic and changes frequently. After [...] a gesture, the hands are often retracted to a position different from where they departed. […] these are not arbitrary positions [...] but rather represent the speakers' embodied orientations to the ongoing interaction in correlation to the sequential structure of talk (n.p.).

For the most part, however, research has usually not been interested in analyzing the potential of holds as it has been for expressive phases in sign and gesture as holds mainly happen for reasons other than the articulation of propositional content (Cibulka, 2016).

Nevertheless, this chapter considers holds for their relevance as part of the interactional practices that speakers and signers use to manage the conversational flow of continuously evolving interactions. I argue, in line with Park-Doob (2010), that these moments of "embodied stasis afford a powerful array of functions relating to the management of [interaction] and expression of ideas and contexts over time" (p. 3), involving word searching activities, overlap resolution, floor holding, checks for understanding, the presentation of which forms the basis of the forthcoming sections. The primary aim in this chapter is to explore the range of interactive functions of holds, in which the hands remain with an identical configuration, location, and orientation over a certain lapse of time. In the following, the focus on those moments of non-movement and their implications for the management of social interaction are explored in SpL and SL discourses.

1.3 Holds in SpLs: A review

Different phases of the "movement hierarchy are functionally distinct in that they synchronize with different levels of prosodic structuring of the discourse in the speech" (Kita et al., 1998, p. 29). Therefore, it was mentioned earlier that pre-stroke holds were more likely to synchronize with cohesive discourse markers (including pronouns, relative pronouns, subordinating temporal adverbials, such as *while, when, as*) while post-stroke holds were more produced "to temporally extend a single movement stroke so that the stroke and the post stroke hold together will synchronize with the co-expressive portion of speech" (p. 29).

Other studies have found that holds tend to co-occur with speech pauses (De Stefani, 2005; Park-Doob, 2010), and more specifically, with speech disfluency markers (Graziano & Gullberg, 2018; Seyfeddinipur & Kita, 2001; Seyfeddinipur, 2006). For instance, Graziano and Gullberg (2018) found that all kinds of gestures are mostly held or suspended when speech stops. The authors' results showed that all speakers, "children and adults, competent or learners, either interrupt an ongoing gesture when speech is interrupted (i.e., they stop or hold the preparation) or they freeze it (i.e., produce a post-stroke hold)" (p. 11).

There are times, however, when the functions of holds extend beyond the ones of synchronizing with speech as cohesive and lengthening devices or associating with cognitive processes involved in speech pauses and disfluencies. There is another range of functional possibilities taken by gesture holds that is linked to the management of social interaction.

In some of the earlier work that included holds as part of the study, Duncan (1972), on analyzing some signals and rules for turn taking in spoken conversation, found that gestural holds were consistently performed to signal the end of a speaking turn. In other studies related to talk-in-interaction, researchers have also found other uses of holds in the management of turn-at-talk. For instance, Kendon (1995) examined gestures as question-marking practices in a corpus of Southern Italian speakers. In his study, he reported on some cases where the hand(s) of the speaker remained on hold beyond the end of the main speaker's turn as a way to make clear to the addressee that what has just been uttered is part of the utterance and acts as a question aimed at the addressee. In a related study, Mondada (2007) analyzed the use of index pointing as a means deployed by the speaker to project the next turn. Similar to Kendon's description of gestural holds as a way to extend a question beyond the end of a speaking turn, Mondada also reported on some instances where a gesture is held until the main speaker has delivered his/her entire spoken content, remaining up to the end of the addressee's response as acknowledgement.

These types of findings have been taken up in other analyses where it has been demonstrated that when the hands remain on hold after the end of a turn, such holds are viewed as cues to elicit addressee's responses. In other words, these studies have noted that holds extending beyond the spoken utterance occur when a response for sequence completion is urged for by the gesturer and that the retraction phase indicates some kind of understanding or acknowledgement with regard to the response" (Cibulka, 2015, p. 10). Thus, for instance, Sikveland and Ogden (2012) conducted a study on hold gestures across turns. The authors demonstrated that when speakers produced holds, they conveyed to their conversational partner a problem of understanding, such as "identifying a referent, interpreting an ambiguous turn at talk, or making sense of a more complex telling" (p. 169), and that these gesture holds remain maintained as long as this problem of understanding is left unresolved by both parties. Moreover, Sikveland and Ogden showed that the moment when gesture holds were back to rest "coincides in time with places in the spoken components of turns where the problem of understanding is resolved" (p. 169). In other words, "gesture holds provide a visible means for marking something out as 'not yet quite dealt with', and their retraction as a way of displaying (literally) that the issue has been resolved" (p.194).

Park-Doob (2010) also focused on the analysis of gestural holds in interaction as a way for a speaker to maintain "expression across spans of time, as well as maintenance of control and a claim to 'speakership'" (p. 137). More specifically, he argued that holds "can support continued expressiveness and interpretability" (p. 1), that is, that the concept introduced by the gesture remains active, enabling the addressee to draw information from a gesture hold. In fact, he claims that speakers are able to consider holds as "transitive objects meant to form the basis of a response by the listener" (p. 137), that is, holds come to play a role in turn-taking transitions, especially this is combined with non-manual cues such as the addressee's sustained gaze direction at the primary speaker (Stivers & Rossano, 2010). Park-Doob (2010) argues that such holds, as a results, are no longer tied to the maintenance of speakership but are instead "explicitly meant to enforce a context for a transfer of speaking duties" (p. 137). In other words, gestural holds allow for new turn transitions of speakership. By contrast, he adds, by leaving the hands on hold throughout the entire addressee's contribution, "the original speaker can seek a limited response while attempting to maintain the dominant speaking role" (p. 137).

Similarly, Cibulka's (2015) study focuses on holds to highlight their use by speakers to "indicate that a pursued trajectory or line of action is maintained, suspended or abandoned" (p. 3). He also found that speakers tended to adjust their location of holds to project their claim of speakership. Based on the analysis of approximately 8 hours of Japanese conversational data, his results suggest that what he calls "prolonged gestural holds", viz., a post-stroke hold [that] often exceeds the boundaries of the spoken utterance where the gesture has originated" (p. 7) are usually deployed by speakers as a way to communicate to the addressee that a response is expected from them. This kind of idea was acknowledged by Bavelas (1994, citing personal communication with Kendon) who states "when a gesture is held longer than would be needed simply to convey information, it becomes a kinetically held question, that is, a request for response from the addressee".

A last study on holds adopting an interactive perspective is De Stefani's (2005) analysis. In his work on gestural stasis, De Stefani makes the distinction between different kinds of holds depending on the 'constraints' applied during the course of production of these holds arising from the conversational exchange. He distinguishes between gestures that are suspended (based on Schegloff's (1984) and Streeck's (2002) views) and gestures that are held. Suspended gestures only occur when conversational trouble emerges due to certain obstacles arising during the interaction. Thus, when a speaker performs a gesture, the ongoing gestural excursion can be interrupted due to external circumstances (e.g., overlapping talk) without the gesture being aborted. Rather, the interrupted gesture remains on hold until the conversational trouble is solved by the parties involved. On the other hand, gestural holds (gestures that are suspended) correspond to post-stroke holds that, as Cibulka defines (2015), often go beyond the boundaries of the speech utterance. These types of holds are not interrupted but maintained by the primary speaker. De Stefani points out that this difference between maintained *vs.* interrupted holds has different interactional implications. For instance, he demonstrated that gesture holds were used as a way to promote participation of participants while gesture suspension was used as a means to compete for the next speaking turn.

All in all, these studies conducted on holds and other less attended gestural phases (e.g., rest positions) in spoken interaction have shown how the hands are not only to be perceived "as a means of expression in concert with speech" (Cibulka, 2015, p. 6) but also as a way for participants to show involvement or speakership in social interaction. Holds actually represent recurrent practices in the speaker's management of social interaction (e.g., turn taking, repair) enabling participants to reach intersubjective understanding (Sikveland & Ogden, 2012). All of this sheds light on how co-participants (speaker and addressee) construct their talk-in-interaction moment-by-moment through various embodied strategies that also include other gestural phases than the stroke in order to produce composite utterances (Enfield, 2009).

Taking into account the interactive mechanisms of gestural holds within social interaction allow for a better and more accurate depiction of holds' functioning in real language use. In other terms, the interactive uses of holds complement the speaker-directed perspectives usually established for holds' functions, as pointed out by Graziano and Gullberg (2018):

> Such functional analyses of holds in interaction are not in contradiction to the current findings concerning the speech production process. Instead, they provide a window on the multi-functionality of gestures in general and suspensions/holds in particular, whereby both speech and gesture production processes are subject to multiple influences in interaction (p. 13).

The following analysis will primarily focus on such interactional aspects of holds but first, the way studies have examined holds in SL conversation is introduced: What about the status of holds in SL research? Is there a similar approach of holds in SL?

1.4 Holds in SLs: A review

As described previously, holds are part and parcel of the anatomical structure of gestures and signs (Kita et al., 1998). They have been recognized as a recurrent element in signed discourse for which a number of distinct linguistic functions have been described. Some of these functions are introduced below. Yet, given the primary objective set out in this dissertation to focus on the interactional dimension of holds, the linguistic functions of holds are not examined further (see Notarrigo, 2017, for a comprehensive review of holds' functions in signed discourse).

As reviewed by Notarrigo (2017), holds can be considered from a twofold perspective in SLs: as a lengthening phenomenon at the beginning and/or ending of signs or as a pause phenomenon to mark syntactic boundaries. While the former has different functional implications (listed below), the latter is recognized as such when "(a) a sign executed with continuous or repeated movement was extended by holding the hand(s) without movement in the terminal position; or (b) a sign executed with such a hold was extended by sustaining the hold" (Grosjean & Lane, 1977, p. 105). Only the different roles of holds as a lengthening mechanism and the resulting functions at different levels of linguistic enquiry are reviewed next.

Comparable to the role of gestural holds in SpL discourse, dependent holds in SLs allow for the sign being produced to be preceded and/or followed by a hold, which is maintained in time and space for a certain lapse of time. As mentioned by Notarrigo (2017), holds in SLs are not the unique phenomenon to operate as a lengthening mechanism (other kinds have been pinpointed by some researchers, see Stewart, 2014). Yet, the lengthening of signs played by holds in the stream of sign production by signers has different functional implications at the level of coordination, semantics, structure of discourse segments, management of cognitive processes and hesitations, and interaction. The latter being the focus in the present study. These types of functions are briefly presented in the following lines.

First, similar to the phonological function of post-stroke holds in SpL as a way for gesture and speech to synchronize, Kita and colleagues (1998) state that such synchronization is visible at the level of the manual articulators. Thus, for the production of signs in SLs, the hands synchronize as well, and a hold may take place on one of the hands waiting for the other one to reach the first one.

A hold can be used to add a specific meaning to a sign. For instance, Notarrigo (2017) presents the following: a signer can produce the lexical sign for TO WATCH and by holding the hands in the appropriate position, orientation, and configuration indicate the duration of such activity. Other non-manual characteristics (viz., facial expressions) participate in this meaning-making process as well. Moreover, as cited in Sandler and Lillo-Martin, "Supalla and Newport (1978) show that the hold at the end of a sign can be added derivationally, distinguishing for example the sign for FLY (by plane), which employs continuous movement, from FLY-THERE, with a hold" (2006, p. 125).

In addition to adding meaning to signs though manual holds, one of the particularities of SLs is the ability for signers to express simultaneously different types of content. Kimmelmann et al. (2016) highlighted this in an example from RSL. The authors report that to form the following statement: "he is offended", the signer produces the pronoun "he" with the left hand while the sign for "offended" is done with the right hand. This can also occur with manual holds where the dominant keeps signing while the other – non-dominant – hand remains on hold, maintaining the end of the first sign (Kimmelman et al., 2016). This has been described as weak hand holds or BUOY in Liddell's (2003b) terms, and plays a structuring role in discourse:

> Signers [...] produce signs with the weak hand that are held in a stationary configuration as the strong hand continues producing signs. Semantically they help guide the discourse by serving as conceptual landmarks as the discourse continues. Since they maintain a physical presence that helps guide the discourse as it proceeds I am calling them buoys (p. 223).

Another aspect that might play a role in the apparition of holds is the information load imposed upon signers (e.g., role shifts, new *vs.* given information and non-conventional signs). Stewart (2014) showed that heavy loaded content information had an impact on sign production, and particularly, sign lengthening. He argues that in addition to providing extra time to process higher information content and articulate the signs accurately to convey the message, the lengthening of signs "also gives the addressee additional time to interpret and process the extra information" (p. 95). Sign lengthening might also occur during moments of conversational trouble between signers. This might result in holds conveying the signer's hesitations. Thus, holds can participate as much in the fluency as in the disfluency of signed discourse (see Notarrigo, 2017 for a study on hold as (dis-)fluency marker in LSFB).

Lastly, sign lengthening can also play an interactive role in signed talk. Stewart (2014) briefly mentions that as a strategy to ensure the addressee's understanding and following by eliciting a response but also as way for the signer to stress a particular point. These types of roles are the ones that will be taken into account when dealing with the data and the analysis of holds.

To sum up, holds have mostly been examined for their roles at the phonological, (morpho)-syntactic, and semantic levels of linguistic analysis as well as a way for signers to cope cognitively with higher information content but more rarely so, as a strategy to manage conversation. Only few researchers have devoted their attention to this kind of analysis in signed talk. Moreover, their attention has primarily been on the interrelations between holds and turn-taking strategies while other interactive functions have been backgrounded. In the following lines, some of these studies on holds from an interactive perspective are reviewed.

Baker (1977) conducted pioneering work on interactional practices deployed by signers in ASL. More specifically, she examined different types of strategies implemented by signers during turn taking. In her analysis, she pinpointed uses of holds occurring on the last sign of a proposition to "either signal turn continuation or turn shifting" (as cited in Groeber & Pochon-Berger, 2014, p. 4). Additionally, Baker (1977) highlights the importance of taking into account the role of gaze direction with the turn-shifting function of holds occurring in final position of a proposition. Baker states that the hold in combination with the signer's gaze at the addressee indicates the end of the primary signer's turn and acts as an invitation for the addressee to take the floor. Thus, the hold signals a shift in speakership and, therefore, acts as a turn-yielding device. Once the next signer takes the turn, the first signer releases the hold and brings the hand(s) back to rest, thereby signaling his/her turn is closed. Similarly, a hold that is not simultaneously accompanied by the signer's gaze at the addressee is conceived as a turn continuation device by Baker (1977) given that in such occasions, the potential next signer cannot claim speakership without the primary signer's gaze. Hence, in Baker's analysis, the gaze occupies a central position in assigning a function to a given hold along with the fact that, in both kinds of functions described (turn yielding and holding), the hold delays or even substitutes the retraction of the hand(s) to the rest position, which according to Groeber and Pochon-Berger (2014): "would most clearly embody turn completion (p. 4).

Groeber and Pochon Berger (2014) conducted a study on turn-final holds in DSGS interaction. The authors examined the placement of holds within turns as well as the timing of the release of such holds, and the resulting implications of these social actions for a better understanding of human communication. Based on a 90-min. data sample of DSGS conversation in a classroom with hard-of-hearing participants, their findings complete what Baker (1977) found for holds to act as turn-yielding regulators in ASL but Groeber and Pochon Berger also found that holds were used for other turn-related purposes. The authors discussed two examples in their (2014) paper: (1) a speaker who did not release his hold despite the fact that the next speaker had already taken the floor, and (2) a hold that was not released at all "but maintained throughout the responsive turn" (p. 9). Then, upon observing the temporal organization of holds (viz., their duration) within turn taking, the researchers displayed that the moment holds are released is finely coordinated with the signer's analysis of his/her addressee's conduct, with what s/he projects to accomplish next in the course of the dialogue. This kind of behavior was particularly noticeable in the results for holds occurring at the end of a turn with a strong next action projection, as in the case of questions that project an answer. Groeber and Pochon-Berger's results concur with other studies analyzing motivated uses of holds at the end of signs that mobilize the addressee for a response (e.g., in VGT, de Vos et al., 2015). All in all, Groeber and Pochon-Berger's work sheds light on the relevance for considering these holds as part of the interactional practices that signers use to be and remain in tune with others, and more particularly, to achieve intersubjectivity on a moment-by-moment basis:

> as an embodied resource, holds make publicly available on the spot one's current expectations and understanding of mutual conducts. These conducts and expectations are emerging in and from interaction; they respond to local contingencies and are therefore continually revised and changed within the talk-in-progress (p. 14).

Other studies addressed the different changes occurring in the trajectory lines of interaction when conversational difficulties appear and repair is necessary (viz., a moment during which participants deal with the conversational trouble that emerged before returning to the main conversational agenda) (e.g., Cibulka, 2016; de Vos et al., 2015; Floyd et al., 2016; Manrique & Enfield, 2015; McCleary & Leite, 2013).

For instance, working on other-initiated repair[39] (OIR) in conversation across three different unrelated languages, including Northern Italian, Cha'palaa language of Ecuador, and LSA, Floyd and colleagues (2016) found that if the participant who started the repair sequence produced a hold with his/her turn, that hold was only released once the repair had successfully been achieved. As such, the hold worked as a "display of the speaker's orientation to the ongoing unresolved status of the repair sequence, and the subsequent disengagement from the hold displays the problem has been solved and the progressivity of the interaction can resume" (p. 176). These findings concur with previous results on unresolved OIR conducted on LSA (Manrique, 2011). A particularity with Floyd et al.'s research (2016) distinct from other studies on the interactional aspects of holds is the fact that Floyd et al. make a parallel with the obtained results for the timing of holds in their study with similar outcome in spoken language research. They claim that: "the cross-linguistic similarities uncovered by this comparison suggest that visual bodily practices have been semiotized for similar interactive functions across different languages and modalities due to common pressures in face-to-face interaction" (p. 199). Moreover, the authors did not only consider holds of the hands but also those of other articulators, including movement of the head, facial expressions, gaze, and posture, offering a more encompassing perspective on the behavior of holds in interaction but their study is still restricted to the turn-taking system in signed talk.

Another scholar, Cibulka (2016) analyzed holds not only of the hands but also of gaze, various facial markers, and body postures. He showed that holds could express a wider range of functions in signed conversation, beyond the turn-taking system. While he also investigated holds in conversation repair sequences, his work focused on moments in signed interaction when holds occurred for other purposes, including during sequences of a joint word search activity or during moments of repair sequences involving overlapping signing. On exploring holds, filler, and gaze shifts away from the addressee, Cibulka highlighted their role as ways of displaying trouble in the context of word searches. Moreover, he drew a similar argument with a finger wiggle

[39] Repair can be classified into two types: "self-initiated, in which speakers redo or reformulate all or part of a turn without any on-record prompting by their addressee, and other-initiated, in which an addressee signals a problem, typically in the next sequential position after the problem turn (Schegloff et al., 1977, pp. 363–364)" (as cited in Floyd et al., 2016, p. 177).

acting as a filler and a gaze shift to initiate repair in interaction. On concluding with his results, he stated that by holding signs, signers "display trouble and by averting the direction of their gaze they display a temporary departure from the project or line of action that has been set up by prior actions" (p. 456).

Other functions instantiating the potential of holds in interaction concern their roles in collaborative repair featuring overlaps[40] and as part of speaker change. The conversational trouble usually comes to an end when one of the signers stops signing. In his results, Cibulka (2016) showed a woman, Lisa, who was in the middle of telling her anecdote when another participant, Rob, jumped in and asked her a question. To answer Rob's question, Lisa momentarily stopped signing, which resulted in a "half-hold" (Cibulka's term because it constitutes a segment of non-movement occurring in an intermediate position between the stage and the home positions). Arguing for holds' relevance as part of the local context and based on his results, Cibulka emphasizes that holds "should be accounted for as being part of an established interactional practice rather than as failure or incomplete signs" (p. 459). Thus, when manual sign production is conceived as a way to articulate propositional content, the importance of the roles of holds in interaction is not of much relevance. They, nevertheless, become meaningful means when manual sign production is viewed as means of regulating aspects of signed talk (Cibulka, 2016, p. 447). Moreover, similar to the claim put forward by Floyd and colleagues, Cibulka is also an advocate for a universal regarding the interactional practices between spoken and signed conversations, as he believes that such practices are not fundamentally different from each other at that level of language analysis.

2 Detecting Holds in LSFB and BF Discourses

The methodology used in this chapter is partially based on Notarrigo's (2017) previous work. Notarrigo carried out her study on holds as potential (dis-)fluency marker in LSFB discourse. Therefore, some of the criteria for holds' identification are based on the methodology she established in her dissertation. By contrast, the categorization of holds, is entirely based on the functional typology established within the current dissertation's framework.

2.1 Hold identification

The first step, following Notarrigo (2017, p. 151), consists in watching the video and stopping as soon as there seems to be an apparent prolonged halt on a manual movement to verify whether this initial impression is concretely followed by a succession of fixed frames. Thus, the first task is to detect either moments when the hands freeze before or after the production of a sign/gesture for a certain lapse of time. Stemming from this, comes the issue of determining a threshold when the hand(s) remain(s) fixed so that they are considered holds. On this issue, I rely on Notarrigo's results of the inter-rater agreement test conducted on holds' identification in LSFB. After submitting the test to four deaf colleagues whose primary language is LSFB, the results indicate that, in order to reach an accurate description of holds, a

[40] Overlapping talk refers to the action when two participants talk at the same time or sign simultaneously (Cibulka, 2016).

threshold of 200 ms corresponds to the most consistent minimum score where most holds display a higher agreement rate among annotators. As a matter of fact, Notarrigo's test highlights that when taking into account only the holds occurring at the beginning of a sign and at its end that last for 200 ms or more (and not below), Cohen's K improve significantly: ranging from satisfying to excellent (see Notarrigo, 2017, pp. 152-159 for a detailed description of the IRA test). Therefore, the minimum threshold of 200 ms allows annotators to remain consistent throughout the detection of holds when annotating the LSFB data. The same applies to the detection of gestural holds in the BF Corpora.

Then, after deciding upon a threshold, the opening and ending boundaries of holds in ELAN are delimited. The opening boundary "[" for a hold in ELAN is set when the hand(s) stop(s) moving while in the previous frame, the hand(s) is/are still moving. On the other hand, the ending bracket "]" is put right before the frame where the hand(s) resume(s) moving:

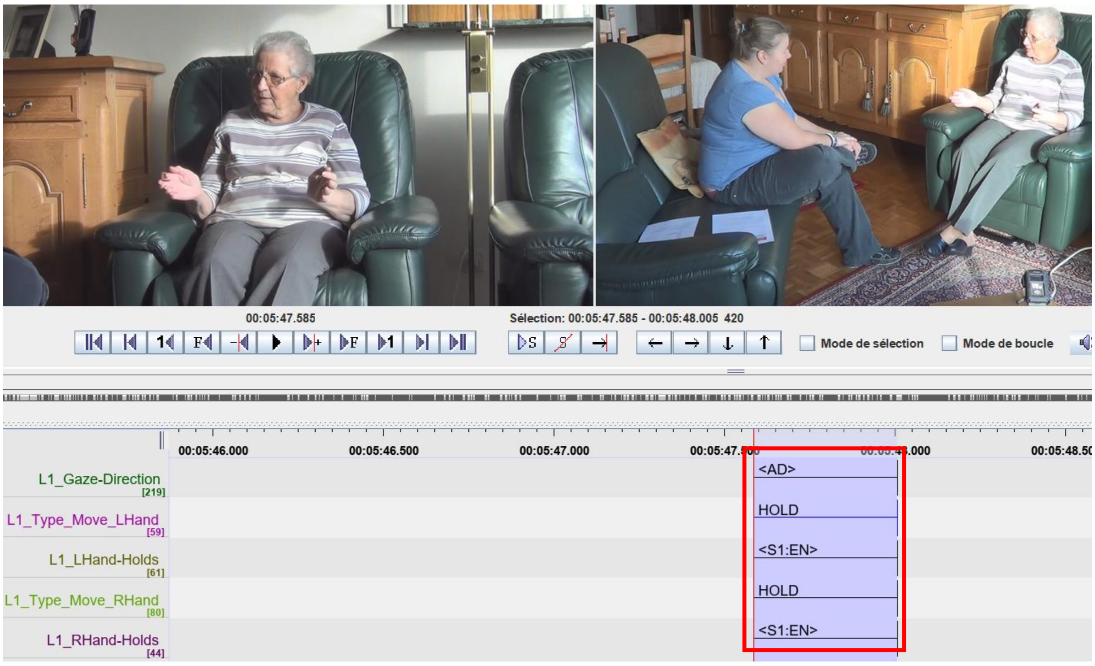


Fig. 75: Tier Organization for the annotation of holds in ELAN (CorpAGEst, S2, C003).

Thus, in Fig. 75, C003's two-handed hold occurs at the end of the iconic gesture for "a big basket" (presented in Fig. 73) and is therefore identified as an <S1:EN>. The <S1:EN> opening bracket in ELAN is put when the hands stop moving in the position, handshape, and orientation displayed in the figure while the closing bracket is placed as soon as the hands resume moving to keep on with the conversational topic.

Similar to section 3.3 in chapter 2, holds are transcribed as <HOLD> and those articulated by the right, left, or both hands are annotated as <HOLD:R>,<HOLD:L>, and <HOLD>, respectively. All of them are annotated on an independent tier in ELAN dedicated to the type of movement performed by the speaker or the signer (Tier name: Type_Move). Then, on a dependent tier (also known as "child tier" and divided between "RHand-Holds" and "LHand-Holds"), the type of holds performed by the signer/speaker is annotated. This child tier includes different main types of holds identified in the signing/gestural stream: <S1>, <S2>, and <S3>. They are described as follows:

- **<S1:ST>** corresponds to a hold occurring at the beginning of a sign/gesture. It matches pre-stroke holds as defined by Kita et al. (1998).
- **<S1:EN>** corresponds to a hold occurring at the end of a sign/gesture. It matches the post-stroke holds as defined by Kita et al. (1998).
- **<S2:NE>** correspond to a hold occurring in neutral position between signs or gestures in front of the signer/speaker's body (regardless of the kind of formal characteristics the hands adopt)[41].
- **<S3:IN>** corresponds to a hold occurring in the shape of an index, identified by Notarrigo (2017) as a floating index with no grammatical meaning in itself (see its definition in Chap. 4, section 5.3).

Fig. 76: Example of a <S2:NE> (833 ms) in LSFB, Task 04, S002 (03:10.110-03:10.943).

A last independent tier that is also part of the equation and that is coordinated with the above-mentioned manual tiers is the gaze-direction (Tier name: Gaze-Direction), in which the different kinds of direction of the gaze are identified with the co-occurring holds (also visible in the figure above).

After having presented the tiers dedicated to holds and their different types, I now turn to when a cessation of movement is considered to be a hold in the data. First, cases of selected holds are introduced, followed by those that are not included in the analyses despite the lack of motion present in the gesture/signing stream.

The cases selected as holds are partially following Notarrigo (2017). They consist of what Notarrigo refers to as "canonical holds" but they also include those occurring at the end/beginning of PUs and IFE-Gs. First, canonical holds include cases where no doubt persists as regards their identification. This means that: 1) their duration equals 200 ms or more and 2) they occur at either the beginning or the end of a sign/gesture. These holds match the <S1:ST> and <S1:EN> tags. They correspond to a manual halt, in which the location, handshape and orientation of the hand remains unchanged throughout the hold in question (for at least 200 ms) (see Notarrigo, 2017, p. 160 for illustrations of these typical holds depending of the type of signs in LSFB, viz., one- *vs.* two-handed, symmetrical *vs.* asymmetrical signs). Additionally, in order to

[41] Notarrigo (2017) makes the distinction between different types of <S2> depending on the kinds of characteristics the hands display during the hold. She distinguishes between <S2:NE> where the hands are rather relaxed, <S2:CR> where the hands are crossed, and <S2:BO> where the hands are alongside the body. I did not follow such a distinction given the fact that these are irrelevant for the functions of holds in interaction.

remain consistent with the point mentioned above and because these two types of manual forms are analyzed in the current project, pre- and post-stroke holds occurring on PUs and IFE-Gs are also counted as holds. More particularly, in the case of two-handed IFE-Gs or PUs followed by a hold in LSFB and BF on the left or right hand, this hold is considered as part of the period of the previous two-handed gesture or sign. The hold occurring at the beginning and/or ending of the IFE-G or the PU is simply annotated on a separate dependent tier for the hand in question.

Then, holds occurring during overlapping talk/signing are included. Notarrigo does not include these kinds of holds in her study because these moments fall under the spectrum of interaction management. I, in contrast, take into account these moments when the addressee intervenes during the primary speaker/signer' turn, which results in a gestural or signing hold. In other words, if the hands freeze during the intervention of the addressee and are maintained for at least 200 ms, these moments of non-movement are considered as holds in the current framework. They are counted as such because of their interactional implications and relevance in turn-taking management.

Lastly, in the case of LSFB, simultaneous holds occurring on two different signs are taken into account as well. Similarly to Notarrigo (2017), I consider a hold if, in the case of two different signs produced by each hand, both manual articulators stop for at least 200 ms. As illustrated in Fig. 77, the signer produces a simultaneous hold. First, he performs the sign PHOTO with both hands. Then, leaving his left hand on hold, the right hand produces the sign OBVIOUS. Once he finishes, both hands are maintained in this position for 250 ms. This relevant example is borrowed from Notarrigo (2017, p. 165):

Fig. 77: Example of a <S1:EN> (250 ms) in LSFB for OBVIOUS.

Alternatively, other types of apparent non-movement moments are not recognized as holds and therefore are not selected as part of the analyses. These include holds lasting less than 200 ms. As attested by the inter-rater agreement test carried out by Notarrigo (2017), holds that last less than 200 ms do not allow for a consistent representation of the phenomenon. The same is true for other phases that include preparation, return, and rest positions. Preparation nor return phases (including partial or total retractions) are taken into account given that the hands remain on the move to reach the rest position or keep producing other signs/gestures. In a similar vein, rest phases are not coded as holds either even if both (hold and rest phases) are characterized by a lack of movements. In a rest phase, the hands usually are devoid of any muscular tension. Instead, they are relatively relaxed and often supported by some part of the body or some piece of furniture (e.g., the armchair of a sofa). By contrast, manual holds display some sort of muscular tension in the articulator throughout the execution of the hold (Cibulka, 2016). The only exception is done when the hands are not in midair position but do display muscular tension despite being on the armchair of a sofa or the lap of the participant, as in the following example of a final hold on a slightly raised index:

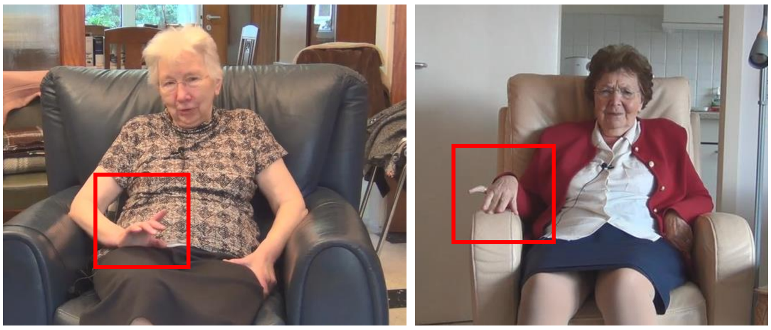


Fig. 78: <S1:EN> of 250 ms (left), S2, C002 (03:29.310) and <S1:EN> of 2563 ms (right), S2, C004 (02:06.801) in CorpAGEst.

As already stated in the section on holds' functions in SLs, weak-hand holds (viz., holds of the non-dominant hand while the dominant one continues signing) are not labeled as holds in the present analysis. These phenomena play a role at another level of linguistic analysis, viz., the structure of discourse, and they fall beyond the scope of the current research.

2.2 Hold categorization

In addition to Notarrigo's (2017) approach, holds in the LSFB and BF datasets received a function following a similar annotation process as the one applied in chapters 3 and 4 for PUs and IFE-Gs, respectively. The only distinction with these two chapters is that only holds functioning at the interactive level of language received an annotation tag. The reason motivating this decision concerns the fact that identifying the rest of the functions of holds implies an entirely different way of annotating the data in the first place. For instance, I mentioned previously that holds can function as prosodic and structuring mechanisms at the phonological and syntactic level of language. Identifying these roles implies annotating and segmenting discourse at a completely different level of linguistic analysis. An endeavor that is not the focus nor the topic in the current project. Therefore, to remain consistent, only holds carrying interactive functions in LSFB and BF receive a functional tag at the macro- and micro-level, that is, as belonging to the main domain of interaction (INT) and the resulting specific functional categories enclosed within this domain.

Now that the methodology as regards the identification and categorization of holds in the LSFB and BF datasets has been presented, the next section details the results.

3 Results

The aim of this section is to compare the use of holds in LSFB and BF to understand better the interactional implications of such holds between two languages, but also between participants (speakers and signers) who have been interviewed under different settings. Thus, the ultimate goal is to contrast the results obtained for LSFB with two different BF datasets: either when the same methodology has been applied or not (LSFB *vs.* CorpAGEst *vs.* FRAPé). Five different aspects of the results are explored and presented. First, the number of occurrences of holds by language, corpus, and participants are outlined (section 3.1). This section of the findings takes into account all holds that have resulted from the annotation process, regardless of their type (S1, S2, and S3). Then, attention is paid to the type of holds in LSFB and BF, including the analysis of pre- and post-stroke holds (<S1:ST>/<S1:EN>), neutral holds (<S2:NE>), and floating index holds (<S3:IN>) (section 3.2) as well as the kinds of gestural forms characterizing holds (PU or IFE-G) (section 3.3). Before turning to the different interactive functions that holds carry in LSFB *vs.* BF, the analysis of the kinds of gaze directions co-occurring with holds is presented under the same section (3.4). A summary of the results is provided in section 3.4.4. Finally, the implications of addressing holds as part of the interactional practices of signers and speakers' repertoire are discussed in section 4.

3.1 Distribution per language, corpus and participant

The frequencies of occurrence of holds in this section are explored between corpus groups (inter-individual variation) and within corpus groups (intra-individual variation). Moreover, the results are displayed at this stage regardless of the type of holds (S1, S2, or S3, see section 3.2) or the formal characteristic of holds (e.g., on PUs or IFE-Gs, see section 3.3)

The results revealed that, in the LSFB Corpus, 547 holds were identified in the discourse of the four signers under study (in a total of approximately 1hr 25min. and 8317 signs), out of which 390 tokens were final holds (<S1:EN>), 55 were initial holds (<S1:ST>), 80 were holds occurring in neutral position (<S2:NE>), and 22 were floating index holds (<S3:IN>). In the BF datasets, considering FRAPé and CorpAGEst together, 573 holds were identified in 2hrs and 06min. of video recorded material, 18 187 words and 2390 strokes (415 holds in FRAPé *vs.* 158 in CorpAGEst). Out of the total amount of holds in BF, 480 were post-stroke holds (337 occurrences in FRAPé *vs.* 143 in CorpAGEst), 36 were pre-stroke holds (30 in FRAPé *vs.* 6 in CorpAGEst) and 57 were holds occurring in neutral space in front of the speaker's body (48 in FRAPé *vs.* 9 in CorpAGEst). None occurrence of <S3:IN> was found in the BF corpora, which suggested that such a phenomenon was specific to signed discourse.

The box plot in Fig. 79 below allows examining visually the distributional characteristics of the number of holds in each corpus, including its central value and its variability. The observation of the medians of each box plot (represented by the black horizontal line in each box) reveals that the medians in FRAPé and CorpAGEst lie outside the box of the other box plot for LSFB signers. Furthermore, the box plot for LSFB signers is higher than the other equivalent plots for BF speakers. This suggests an alleged difference between groups as regards the number of holds produced per 100 tokens by the individuals in each corpus. This is corroborated in Table 26 below where LSFB signers produce, on average, almost 25 holds /100 signs *vs.* 14 and 12 for FRAPé and CorpAGEst speakers, respectively. The four sections of the box plot are especially uneven in size for LSFB. Comparing the box lengths (the interquartile ranges) shows how the data is dispersed between each sample. The longer the box, the more dispersed the data is. This holds true for LSFB and FRAPé while the box length is smaller for CorpAGEst, indicating that the data is less dispersed. For instance, the long upper whisker extends more for LSFB signers, indicating that signers' productions of holds vary more than for speakers.

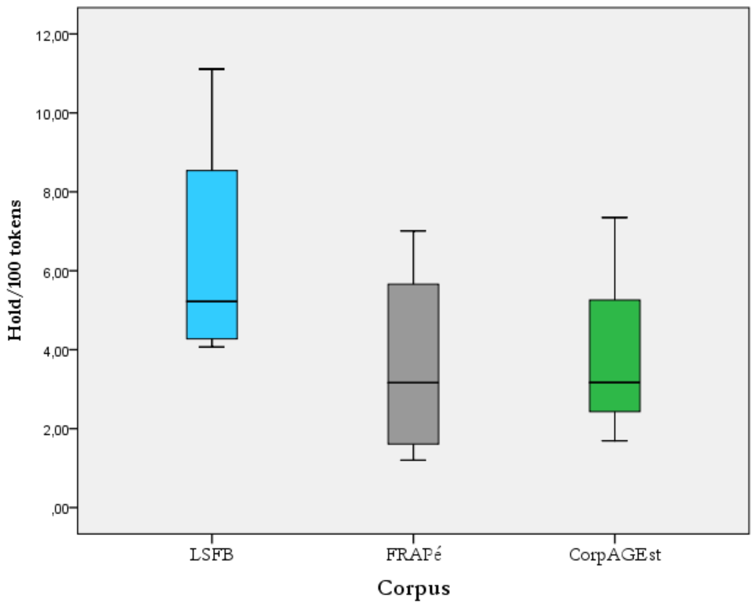


Fig. 79: Boxplot representing the amount of holds per 100 tokens by each individual in each corpus.

The following table brings out in more detail the distribution of holds across corpora and individuals per 100 tokens (signs and words) and per minute:

C1 LSFB	N	/100 Tokens	/min	C2 FRAPé	N	/100 Tokens	/min	C3 CorpAGEst	N	/100 Tokens	/min
S001	106	5.97	6.54	**F001**	126	7.01	8.53	**C001**	38	3.17	3.95
S002	267	11.11	10.44	**F002**	23	1.20	2.01	**C002**	2	.19	.27
S003	59	4.48	5.02	**F003**	91	2.02	3.60	**C003**	24	1.69	2.23
S004	115	4.07	3.88	**F004**	175	4.31	6.73	**C004**	94	7.35	10.70
Total C1	**547**	**25.63**	**25.88**	**Total C2**	**415**	**14.54**	**20.8**	**Total C3**	**158**	**12.4**	**17.15**
Mean	*136.75*	*6.4075*	*6.470*	***Mean***	*103.75*	*3.635*	*5.2175*	***Mean***	*39.5*	*3.1*	*4.2875*
SD	90.238	3.239	2.86	**SD**	63.913	2.606	2.95	**SD**	39.24	3.08	4.53

Table 26: Counts and dispersion of holds across speakers and signers in each corpus.

Shedding light on the overall picture of the amount of holds by corpus, the results above underscore that signers have holds appearing in their signing stream, on average, more than speakers do per 100 tokens (amounting to 25 holds per 100 tokens for LSFB signers *vs.* 14 and 12 for BF speakers, FRAPé and CorpAGEst, respectively). Moreover, as the relatively high values of standard deviation (SD) suggest, there is an important degree of heterogeneity within one group of individuals standing out as regards the production of holds. Such intra-individual variations are greater within the BF datasets, especially in CorpAGEst, than in the LSFB Corpus. The figure below illustrates this important heterogeneity within one group of participants, shedding light on a wide disparity between individuals of the same corpus:

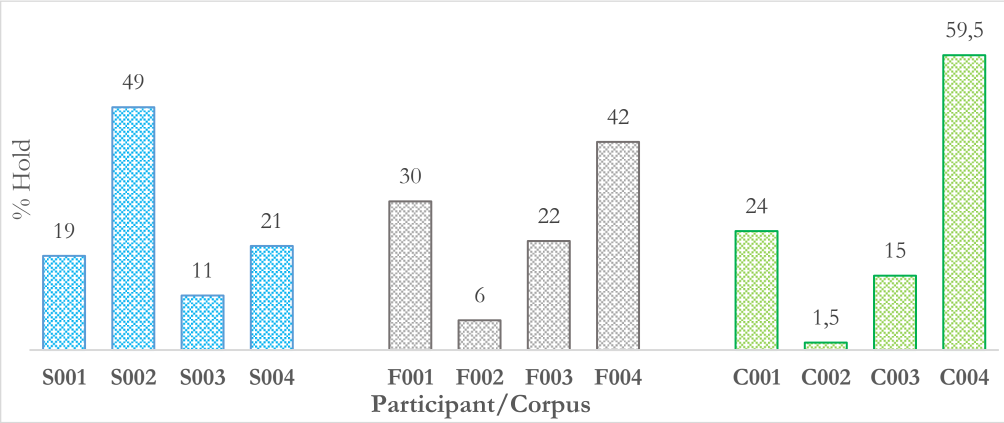


Fig. 80: Number in percent of holds by participant in each corpus.

In the LSFB Corpus, there is an important gap as regards the distribution of holds between the dyads interacting with one another (S001 and S002 *vs.* S003 and S004). In each LSFB dyad, there is one signer who has twice the proportion of holds than his/her conversational partner. This holds true for S002 and S004 who produce 49% and 21% of all hold cases in LSFB *vs.* 19% and 11% for S001 and S003. However, when taking into account the number of signs produced by participant (Fig. 80), it is interesting to note that the S003-S004 dyad displays, on average, a similar amount of holds per 100 signs (around 4 holds per 100 signs), while the other dyad gathering S001 and S002 exhibits a different pattern. S002 has twice as many holds in her discourse as S001 (almost 12 *vs.* 6 holds per 100 signs, respectively). The same applies to FRAPé's dyads: F001-F002 (7 *vs.* 1/100 tokens) and F003-F004 (2 *vs.* 4/100 tokens). These results are correlated in Fig. 80 where a wide gap is observed in the distribution of holds per signer in LSFB and per speaker in FRAPé. A finding that could be put in relation with the forthcoming analyses as regards the uses of holds by speakers and signers as interactive strategies. Signers and speakers may not use holds for the same interactive purposes. Indeed, a possible explanation set forward at this stage for a higher presence of holds in S002's discourse, for instance, could be due to a greater number of interruptions caused by S001, forcing S002 to interrupt her signing production and, therefore, have her hands on hold.

On the speakers' side, the results are more heterogeneous. The results presented by speaker are introduced by considering not only the number of words uttered by each individual but also the number of strokes (viz., the meaning-bearing part of a gesture) performed by each one of them[42]. In FRAPé, F001 is the one who produces most gestural holds in her discourse. She utters 2795 words and produces 290 strokes, which corresponds to an average of 7 holds/100 words and 2 holds every 5 strokes. As for F001's conversational partner, F002, there is approximately 1 hold per 100 words performed and 1 hold every 8 gestural strokes (23 hold tokens out of a total of 1911 words and 165 strokes produced). Concerning the other dyad, F003 and F004, F003's discourse contains 2 holds/100 words and 1 hold every 7 strokes for a total of 4496 words and 633 strokes, which, proportionally speaking, is very little compared to the number of words and gestures. As for the last speaker in FRAPé, F004 utters 4055

[42] As mentioned, because speech rate and the number of gestures vary from one person to another, it was decided to calculate the average number of tokens out of the total number of words + strokes for BF speakers. This decision was also sustained by the fact that in order to compare sign from SLs, it is mandatory to consider speech+gesture as an ensemble (see Vermeerbergen & Demey, 2007).

words in her interview and articulates 780 strokes in her discourse, out of which 4 holds/100 words and 1 hold is produced every 5 strokes, on average.

As for CorpAGEst speakers[43], the last speaker, C004, is the one whose discourse is most marked by holds (7 holds/100 words out of 1278 words and 1 hold every 3 strokes for 272 strokes produced). Next, C001 displays an average number of holds of 3 per 100 words and 1 hold every 5 gestural strokes (out of 1196 words uttered and 125 strokes performed). Lastly, C003 articulates 125 strokes as well and utters 1417 words, which represents a total of almost 1 hold every 6 strokes and almost 2 holds per 100 words.

While this type of analysis allows singling out certain aspects of holds' usage between speakers and signers, it does not allow describing the type of holds occurring in their respective discourse nor the types of gestures/signs on which holds appear. The next section brings to the fore these formational aspects of holds in LSFB and BF with a focus on the kinds of types appearing in the conversation of LSFB and BF individuals.

3.2 Distribution of different types of holds

The above-mentioned sections provided an overall panorama regarding the number of holds present in LSFB and BF discourses as well as the distributions of holds between corpora and participants. Yet, these sections did not include the types of holds (S1, S2, and S3) represented in each language, corpus, and among participants. The subsequent results present such findings.

A first comparison carried out as for the different categories of holds between the two languages, LSFB and BF, is introduced. LSFB presents a repartition of holds as follows. The majority of holds (71% of them) takes place in final sign position <S1:EN> while 10% of holds occur in initial position <S1:ST>, 15% of cases in neutral position in front of the signer's body <S2:NE> and only 4% of <S3:IN>. In the discourse of BF speakers, it can be noted that, roughly speaking, the same tendencies apply. The majority of holds are in final position and the least frequent ones are beginning and neutral holds, as in LSFB. But, contrary to LSFB, the distribution is higher for <S1:EN> with 84% of holds in BF. The proportions of <S1:ST> and <S2:NE> amount to 6% and 10% for BF, respectively.

Table 27 brings out the frequencies of holds by type in each corpus. It is important to keep establishing a distinction between BF speakers (FRAPé *vs.* CorpAGEst) because the participants are not recorded under the same methodological conditions, therefore, this distinction sheds light on a number of informative results. Table 27 shows the following. First, regardless of language (LSFB *vs.* BF) or the corpus group of which the participants belong to, the majority of holds by speakers and signers are final holds <S1:EN>. This holds true for 71% of holds in LSFB and 81% and 90% in FRAPé and CorpAGEst, respectively (*vs.* 10% in LSFB, 7% in FRAPé, and 4% in CorpAGEst for beginning holds <S1:ST>). Yet, CorpAGEst speakers are those whose discourse and gesturing are more characterized by final holds than in the other two datasets, LSFB and FRAPé. As regards the distribution of holds occurring in

[43] An important aspect to take into account is that here, only the results for three speakers are reported. The speaker C002 was excluded from this analysis as she barely produced any strokes in her discourse, favoring non-manual markers, adaptors, and body activities instead.

neutral space in front of the participant's body, CorpAGEst speakers display fewer <S2:NE> holds (6%) than FRAPé speakers and LSFB signers. Comparatively, FRAPé and LSFB individuals produce a relatively similar amount of <S2:NE> (12 and 15%, respectively).

Corpus	LSFB		FRAPé		CorpAGEst	
Hold Type	N	%	N	%	N	%
<S1:ST>	55	***10***	30	***7***	6	***4***
<S1:EN>	390	***71***	337	***81***	143	***90***
<S2:NE>	80	***15***	48	***12***	9	***6***
<S3:IN>	22	***4***	0	***0***	0	***0***
Total	547	***100***	415	***100***	158	***100***

Table 27: Distribution of holds in each corpus by type (S1, S2, S3).

These figures bring to the fore general tendencies between languages and corpora. Given that the SDs. presented in the results of Table 27 imply a relatively high degree of intra-individual variability, the figures below illustrate in more detail such findings and provide a clearer picture of the type of holds in each signer's and speaker's discourse accordingly.

Confirming the tendency observed in the figures representing the distributions of holds by language and by corpus, the most important distribution concerns the <S1:EN> category for all participants. This distribution by individual allows observing that not every person necessarily displays a high amount of final holds in their discourse. For instance, in LSFB, only S002's discourse is characterized by a relative important percentage of final holds (39%). The other signers' results range between 5-15%. The same applies to BF speakers. Those concerned with a distribution of <S1:EN> higher than 30% are the following speakers, F004 in FRAPé and C004 in CorpAGEst. The others do not produce as many holds as those two and their distributions vary from as low as 3% (C002 in CorpAGEst) to 20-25% (for C001 and C003 in CorpAGEst, and F001 in FRAPé).

Bringing the more general observations noted per language and per corpus to a more detailed overview of signers and speakers' uses of holds, there is, in each dyad composing the LSFB and FRAPé corpora, always one person whose discourse is more marked by final holds than the other conversational partner's discourse. In some cases, the amount even doubles. For instance, S001 and S002 have 15% and 39% of <S1:EN> characterizing their respective signing. The same applies to the other dyad, S003 and S004, with 7% and 11%, respectively. In FRAPé, a similar tendency is found. Within a dyad, there is one speaker whose distribution of holds drastically surpasses the other one's.

Nevertheless, few holds take place at the beginning of a gesture/sign. The distributions do not exceed 2-3% (except for S004 with 6%). Holds taking place between signs/gestures, <S2:NE>, in neutral space in front of the body, are less important than <S1:EN> but slightly more present than <S1:ST>, ranging around 7% for all participants. Interestingly, this is the most homogeneous type of holds, in that this category exposes less variability than the other two types of "S1" among and between participants while still being more characteristic of LSFB than BF discourse.

It might be suggested that these <S2:NE> holds do not depend on the speakers or signers themselves to occur. Instead, these holds might have a tendency to emerge when there is conversational trouble, such as during overlapping talk or signing or during word searching activities. This type of hypothesis will be tested when dealing with the interactive functions of holds in order to observe whether those who have a higher presence of <S2:NE> in their discourse are also those who are more frequently interrupted.

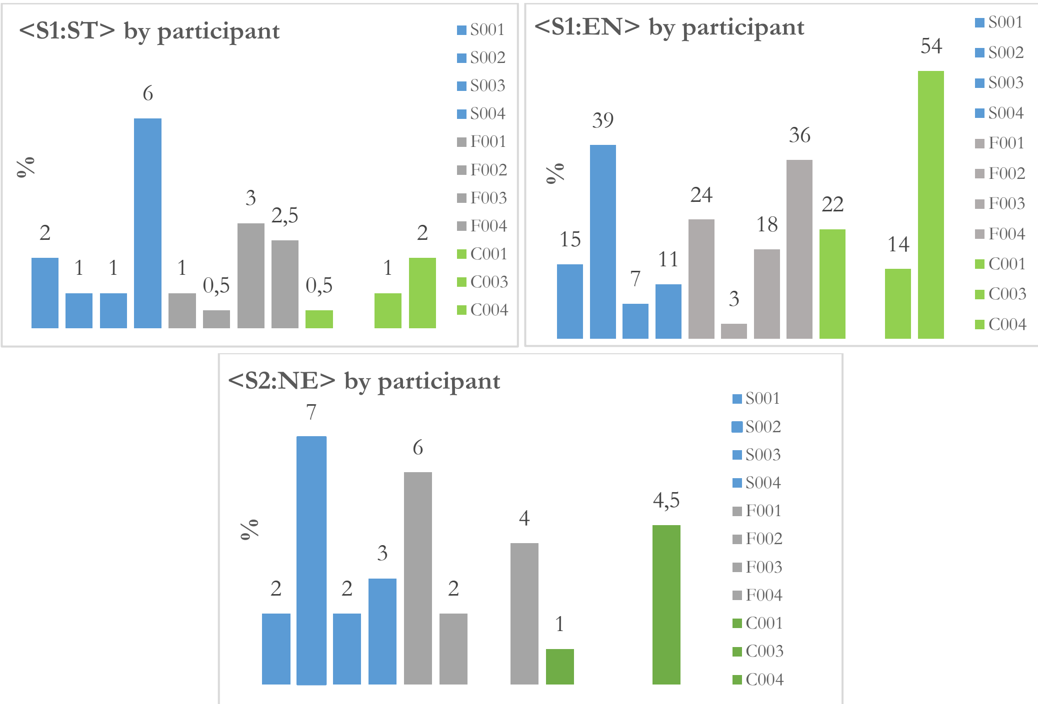
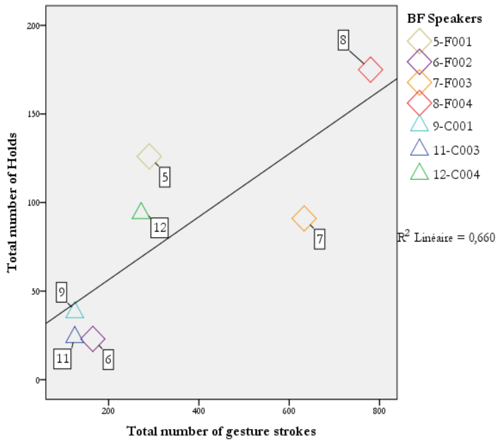


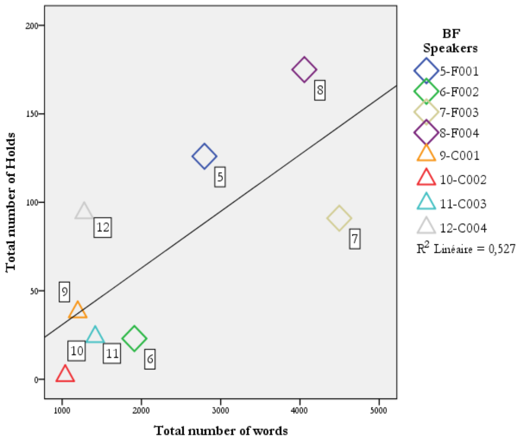
Fig. 81: Percent of <S1:EN>, <S1:ST>, and <S2:NE> by participant in each corpus.

The results presented thus far regarding the number of holds in each signer' and speaker's discourse raised the following assumption: if a participant has his/her hands more often on stage, producing gestures or signing as well as other kinds of manual moves, this participant might be more likely to have more holds present in his/her discourse. Or, at least, there might be more occasions while speaking-gesturing/signing for a hold to occur. In other words, there might be a relationship between the numbers of signs produced and the equivalent proportion of holds occurring on those signs in signers' discourse suggesting that the more signers' hands are moving, the more holds may take place in the signing stream; and vice-versa for BF, the more speakers gesture, the more holds might characterize their gesturing. Nevertheless, given that, in order to compare gesture to sign, it is also important to take into account speech in relation to gesture. Therefore, the following questions are addressed: Are the number of holds in BF influenced by the number of words+gestures strokes produced by BF speakers? And conversely, are the number of holds in LSFB influenced in any way by the number of manual signs produced by LSFB signers?

To answer those questions, a correlation test has been conducted to examine whether there exists a relationship between the total number of gestures and words produced by speakers and the total number of holds. The question is the following: Is there a significant linear relationship between these variables? Results of the Pearson correlation indicate that there is a significant positive association between the number of gestures/words and the number of holds (number of gestures: $r = 0.813$, $p = 0.026$, number of words $r = 0.726$, $p = 0.041$). These results indicate that the more speakers gesture/speak, the more holds they tend to produce. The same test has been applied to LSFB signers. Is there a significant linear relationship between the total number of signs and the total number of holds produced by signers? The results show a moderate positive relationship between the number of signs and the number of holds ($r = 0.575$, p = n.s.).

After conducting the correlation tests, results are presented on graphs called scatter plots in order to visualize the relationship between the two variables under analysis. These plots are meant and designed in this dissertation for informative purposes only given the small number of participants examined in this study (n = 12[44]). Therefore, the present goal is not to deduce any generalizations nor to establish any causality from these results but simply to visualize better the values obtained for the two variables explored and their relationship. Each dot corresponds to an individual, either a signer or a speaker. The Y axis corresponds to the total number of holds and the X axis corresponds to the total number of gestures/signs produced or the total number of words in the case of BF.





[44] In the scatter plot representing the number of gestures in relation to the number of holds in BF, the number of speakers amounts to N=7 and not 8 given the decision not to annotate the gestural strokes of C002 from CorpAGEst as this speaker favored object- and self-adaptors as well as other non-manual gestural markers in her discourse.

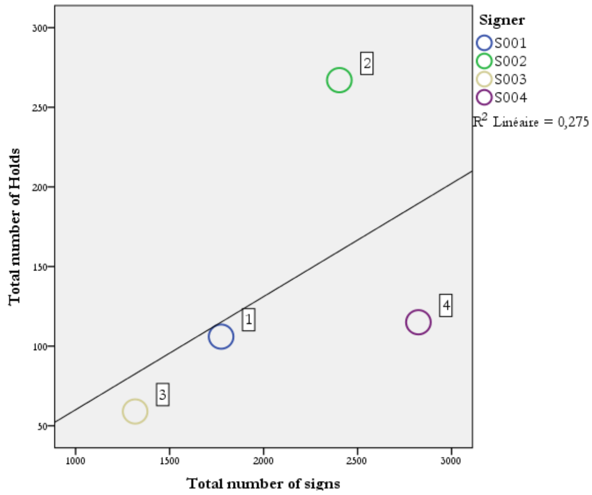


Fig. 82: Scatter plots representing the association between the total number of gestures/words and signs and the total number of holds in BF speakers and LSFB signers.

To sum up this first part, results reveal that signers display more holds per 100 tokens than speakers do (25 in LSFB *vs.* 14 and 12 in FRAPé and CorpAGEst). Digging into the results by corpus sheds light on an important degree of intra-individual variation, especially in CorpAGEst (mainly due to the almost absence of holds by C002). In addition, concerning the types of holds, final holds constitute the most important category in the data and the category that features a higher rate of intra- and inter-variability in the participants' scores. Ultimately, this overall panorama with respect to the number of holds in LSFB and BF, as well as the distributions of holds between corpora and participants gave rise to the following assumption regarding a possible association between the number of words-gestures/signs and the number of holds in BF and LSFB. Correlation results showed a high positive association between these variables in BF and a moderate positive relationship in LSFB. This suggests that as one variable increases, the other one increases as well.

3.3 Distribution of holds on PUs and IFE-Gs

Holds are very heterogeneous as they can appear at different positions (e.g., at the beginning or end of a gesture/sign) but they can also be found on any gestural moves or signs in the manual stream. Within the category of holds, some of these holds have been performed on PU and IFE gestures, two of the manual means investigated in this dissertation for their own sake (see chapters 3 and 4, respectively). In the following lines, attention is paid to the actual distribution of these holds on PUs and IFE-Gs. Two kinds of questions are explored: (1) How many of the PUs and IFE-Gs performed by BF speakers and LSFB signers are concerned with a hold (regardless of the type of holds)? And (2) How do these results (PU and IFE-G holds) compare to the remaining number of holds present in the corpora?

First, out of the total number of holds obtained in the LSFB Corpus (547 occurrences), 10,8% of all holds were on PU gestures (59 PU tokens on hold) and 11,3% on IFE-Gs (62 IFE-Gs on hold). This distribution of PU holds and IFE-G holds was also proportionally dictated by the actual number of PUs and IFE-Gs present in LSFB. In the previous chapters, a total of 489 PUs *vs.* 783 IFE-Gs characterized the discourse of LSFB signers. In relation to the number of PU and IFE-

Gs articulated by signers, 59 PU holds and 63 IFE-G holds were found. This represented 12% of all PU gestures and 8% of all IFE-Gs in LSFB. Then, in FRAPé, 415 holds were found. Out of these, 12.5% were on PUs (52 occurrences of holds) and 15% on IFE-Gs (63 occurrences). This amount concerned 13% of all PU gesture cases and 37% of all IFE-Gs performed by speakers in FRAPé. Finally, in the CorpAGEst Corpus, speakers displayed a total of 158 gestural holds. Out of these 158 holds, 32 were on PU and 40 were on IFE-G, which corresponded to 20% and 25% of all holds performed by speakers in CorpAGEst for PU and IFE-G, respectively. Now, the amount of PU holds and IFE-G holds in relation to the number of PU and IFE-G produced corresponds to 28% of PUs (32 holds of PU out of 113 PUs) and 38% of IFE-Gs (40 IFE-G holds/104 IFE-Gs). The table below brings out such a distribution of PU and IFE-G:

Participant	on PU		on IFE-G	
	N	*%*	**N**	*%*
S001	27/99	*27*	10/207	*5*
S002	15/104	*14*	33/270	*12*
S003	2/67	*3*	10/99	*10*
S004	15/219	*7*	9/207	*4*
Total	59/489	*12*	62/783	*8*
F001	30/112	*27*	26/36	*72*
F002	3/35	*9*	1/10	*10*
F003	1/52	*2*	5/47	*11*
F004	18/199	*9*	31/77	*40*
Total	52/398	*13*	63/170	*37*
C001	22/51	*43*	1/6	*17*
C002	0/1	*/*	0/2	*/*
C003	6/39	*15*	2/5	*40*
C004	4/22	*18*	37/91	*41*
Total	32/113	*28*	40/104	*38*
TOTAL	**143/1000**	***14,3***	**165/1057**	***15,6***

Table 28: Distribution of holds on PU and IFE-G per speaker and signer.

3.4 Interactional holds in SL and SpL conversations

After reviewing the number of holds, their types, and their distributions as regards PUs and IFE-Gs, the present section delves into the interactive functions lying behind manual holds in LSFB and BF. The following question is raised: What is different (or similar) between LSFB signers and BF speakers when holds are used as a mechanism, whose primary function is the management of the ongoing interaction? Such an aspect is analyzed based on the specific interactive functions that holds serve in social interaction. Special attention is paid to the four major interactive functions for holds resulting from the analyses, namely monitoring, planning, turn-holding and suspending. These four primary functions are explored as regards the types of holds they correspond to in each language.

This section aims at understanding the functioning of manual holds when they have to do with the regulation of the ongoing interaction in signers' and speakers' conversations. These moments of interaction management by holds include, for instance, occasions when the addressee intervenes in the ongoing turn of the primary speaker/signer and creates an overlap that momentarily suspends the current flow of talk/signing in addition to anything related to the speaker/signer-addressee relationship. Such hold functions include monitoring, that is, when the primary speaker/signer is seeking attention or acknowledgement or s/he wishes to ensure the addressee is following along with moments for planning, word searching activities, as well as for turn-holding the floor. Results for LSFB are presented first, followed by results for BF, including FRAPé and CorpAGEst.

3.4.1 Overview of holds' interactive roles by language

Fig. 83 below displays the primary interactive functions of holds by language independently of the type of holds concerned by these interactive functions (for the different kinds of holds identified, see 3.2 of this chapter). Four major interactive functions for holds seem to appear in each language, LSFB and BF. These functions are the following: monitoring the addressee, planning forthcoming discourse segments (incl. hesitating, word searching, or pause filling), suspending a turn-at-talk due to the addressee's intervention into the main frame of speakership, and turn-holding.

While these four primary interactive functions for holds occur in both languages, therefore, providing valuable information as regards the most important roles of holds when interaction is concerned, these functions, nevertheless, are not distributed similarly in LSFB and BF. The most striking difference between LSFB and BF concerns the function of suspending one's turn. This specific functional category represents 40% of all interactive holds in LSFB against 6% in BF. There is, thus, a higher proportion of holds occurring in LSFB whose primary implication is the suspension of the hands during the signer's turn due to the addressee's intervention, creating an overlap.

Zooming into the overlaps observed in the signed and spoken data, the number of holds resulting from an overlap is more important in LSFB than in BF data. In fact, among the women signers, 37% of all holds performed by S001 occurred due to S002 overlapping while 25% of S002's holds occurred during S001 overlapping while among the men signers, 29% of all S003's holds and 12% of all S004's holds resulted from overlapping signing. By contrast, in the BF corpora, in FRAPé, only 7% to 15% of speakers' holds are due to overlapping talk by the addressee while the distributions are even smaller in CorpAGEst ranging between 4% and 7% for only two speakers, C003 and C004, respectively.

While this study does not systematically investigate in depth the organization of signed talk, including the practices for overlap resolution and timing (see de Vos et al., 2015; Girard-Groeber, 2015), the results suggest that there seems to be more overlaps in signed interaction than in its spoken counterpart. This, for instance, has been pointed out by Coates and Sutton-Spence (2001). Nevertheless, it is important to underscore that despite a greater amount of overlapping signing, simultaneous talk in signed interaction "is not messy but organized" [...] but that signers "then continue while simultaneously signing for longer stretches than it has been shown for spoken interaction" without resulting in conversational trouble (Girard-Groeber, 2015, p. 211)

Then, the rest of these interactive functions are more prominent in BF than in LSFB. Holds for planning purposes are the second most frequent interactive function for holds in LSFB but the first in BF (44% *vs.* 30%). Next comes the function of monitoring, that is, seeking acknowledgement or following from the addressee, which is most often carried out with holds in BF compared to LSFB (38% *vs.* 26%). The difference in the distributions observed between each language for these two functional categories of holds is relatively similar: there is a 12-14% gap between LSFB and BF for each of these functions, monitoring and planning holds. These categories seem to differentiate the uses of holds in LSFB and BF to a lesser extent than the other uses, viz., turn suspension and turn holding. Indeed, only a very small proportion of holds are used as a turn-holding strategy in LSFB compared to BF (1.5% *vs.* 8%, respectively) while still being the least frequent functional interactive category for both languages.

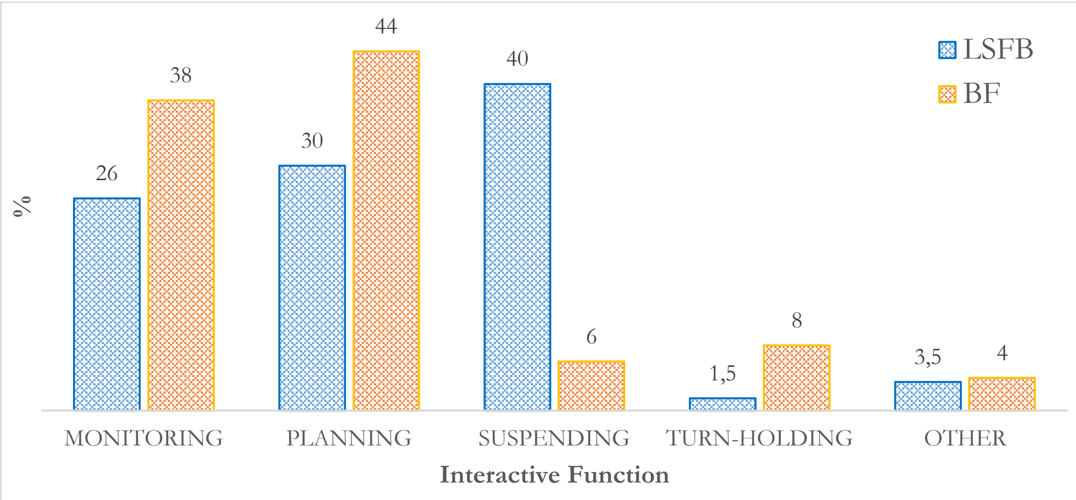


Fig. 83: Distribution of the four major interactive functions of holds in LSFB and BF.

It is interesting to explore the association between the different types of holds (S1, S2, S3) and these four major interactive functions in each language, LSFB and BF, respectively. These results are outlined in LSFB first, followed with those in BF.

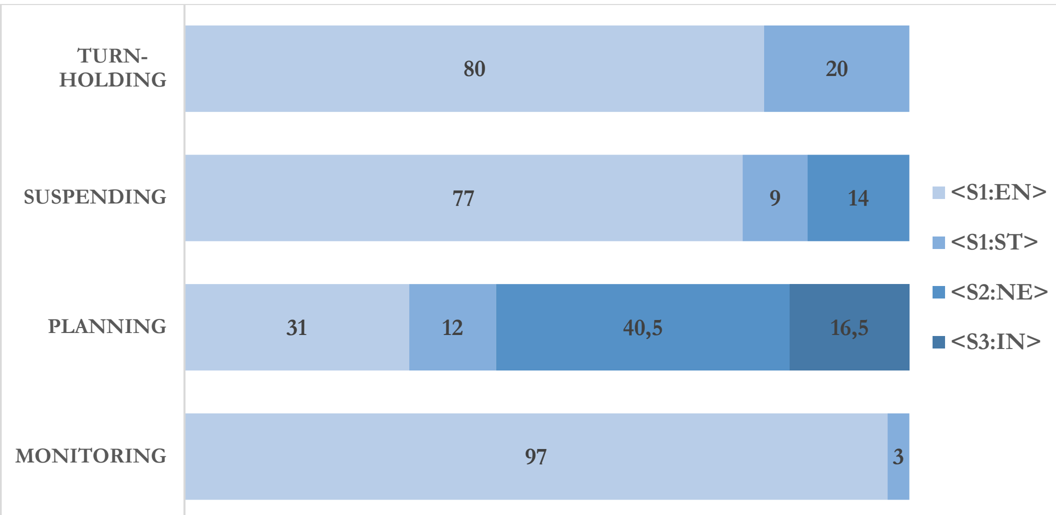


Fig. 84: Distribution in percent of the four major [INT] functions in LSFB according to hold type.

First of all, in LSFB, the two interactive functions for which less variation is observed as regards the type of holds are holds used for turn-holding and monitoring purposes. Indeed, the majority of holds carrying these two functions are mainly final holds, <S1:EN>, representing 80% and 97% of all the turn-holding and monitoring cases in the LSFB Corpus while very few holds carrying these functions tend to be initial holds <S1:ST> (20% for turn-holding and 3% for monitoring holds). Then, in the case of holds for suspending and planning purposes, the distributions are slightly more varied for these two functions than the previous ones. While being primarily on final holds (<S1:EN>, 77%), some suspending holds also take place, to a lesser extent, on initial (<S1:ST>, 9%) and neutral holds (<S2:NE>, 14%). All these functions (turn-holding, suspending, and monitoring) have all in common the fact that all of them are characterized by <S1:EN> holds. The planning function displays a reverse trend and demonstrates the greatest variability with every type of holds representing this function. Thus, not only <S1:EN> holds are present in this function (31%), but <S2:NE> holds are also important for this function (40.5%), followed by the special category of <S3:IN> (16.5%) and lastly, <S1:ST> (12%). An important note as regards this function and the corresponding <S3:IN> hold type is that this type of hold only appears in LSFB and only for planning purposes.

How are these four primary interactive functions distributed regarding the types of holds in BF? The first observation to make in relation to the LSFB's results is that, in BF, the four functions all include the three types of holds (<S1:EN>, <S1:ST>, and <S2:NE>). Similar to LSFB, the two functions for which most of the holds are in gesture final position (<S1:EN>) are turn-holding (86%) and monitoring (91%) but with fewer initial holds (3% and 2%, respectively). There is, nevertheless, a slight difference for these two functions: <S2:NE> holds are also present for these functions in BF (11% for turn-holding and 7% for monitoring). The other two functions, suspending and planning, are less characterized by final holds with 57% of all suspending holds and 72% of all planning holds occur in such a position. These functions also demonstrate more <S2:NE> holds than <S1:ST> types.

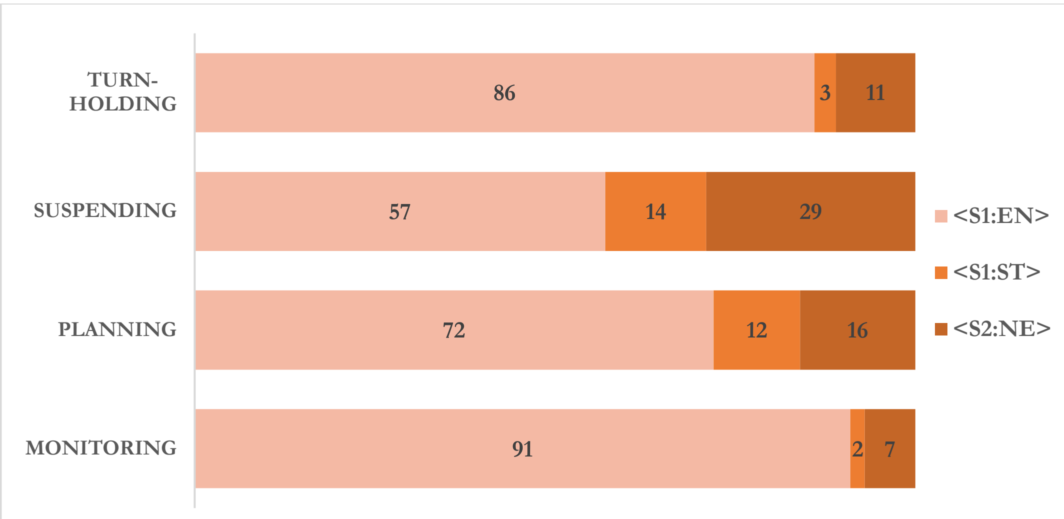


Fig. 85: Distribution in percent of the four major [INT] functions in BF according to hold type.

Echoing LSFB's results, turn-holding holds include the same hold types in BF, except for <S2:NE> hold types that also mark this function in BF but that do not in LSFB.

Planning holds in BF are different from those in LSFB as regards the amount of <S1:EN> devoted to this function (72% in BF *vs.* 31% in LSFB). One of the reasons for this is that there are <S3:IN> holds types fulfilling this function in LSFB while this is not the case in BF. Lastly, suspension holds display more final holds in LSFB (77%) than in BF (*vs.* 57%) but fewer neutral holds (14% *vs.* 29%) and initial holds (9% *vs.* 14% in BF).

3.4.2 Gaze direction combined with interactive holds

What kinds of gaze directions combine with the four major interactive functions of holds? Are they similar or different between BF speakers and LSFB signers? In this section, I am interested in examining the combinations between functions of holds that serve interactive purposes, and specific gaze directions. More specifically, the target of the gaze has been analyzed for each of the four primary interactive functional category of holds. The results are expressed in percentages and based on the major findings discussed in section 3.4.1.

Fig. 86 brings out in more detail the distribution by language (BF *vs.* LSFB) of the different types of gaze directions (viz., as addressed, floating, floating downward and upward, directed at some point in space, changing targets, or as other) according to each interactive function (viz., turn-holding, suspension, monitoring, and planning).

A first striking point, independently of the interactive functions, is the observation of the results regarding the distribution of gaze directions by language are more stable in the LSFB Corpus than in the BF corpora, FRAPé and CorpAGEst. This is reflected in the almost unique presence of only one gaze direction, the '<AD>' category, for each kind of interactive function (with the exception of the planning function). Thus, only the planning function displays a greater number of gaze directions involved in LSFB whereas the other three functional categories, namely, turn-hold, suspension, and monitoring are highly homogeneous in LSFB ranging between 93% and 100% of addressed <AD> gazes.

Therefore, stemming from the fact that there is a more stable use of gaze in LSFB is the logical assumption that speakers change more often their gaze targets "COMPLEX" when performing gestural holds, especially during turn-holding and suspension (38% and 29%, respectively) and less so for the monitoring (11.5%) and the planning functions (10%). Hold cases for turn-holding in BF are also predominantly addressed to their addressee (50%) and some floating variants also emerge in this functional category (12%). Holds during a signer/speaker's turn suspension include a majority of addressed gazes in BF (62% *vs.* 93% in LSFB) but also vague gazes (9%) while this is not the case in LSFB.

Regarding the two interactive functions of monitoring and planning, the former is predominantly marked by addressed (84.5% *vs.* 93% in LSFB) and complex gazes in BF (11.5% *vs.* 5% in LSFB) but also includes some floating gaze types (3% *vs.* none in LSFB), while the latter shows most variability in including all kinds of gaze directions for both languages. But is it the same distribution? There is a greater number of planning holds in BF that are addressed "<AD>" (26%) while this represents a minority in LSFB (6%). Instead, the vast majority of gazes for planning purposes in LSFB are regular floating gazes (43%), followed by downward (11%) and upward (5%) floating gazes. This holds true in BF but to a lesser extent with 25% of floating, 18% of floating downward and 6% of floating upward gazes. Moreover, signers tend to direct their gaze at a particular point in space more than do speakers (21% *vs.* 10%). The different distribution of gaze directions for planning purposes between LSFB and BF can be due to the type of activity involved during the planning activity. For instance, if signers and speakers are more involved in the narration of an anecdote and they suspend their utterance for planning purposes, they might look at a particular point in space while if they experience trouble in finding their words, they might be more inclined to display floating gazes to recall a word or else. Therefore, it would be interesting in a future study to look at the type of activity involved during utterance suspension for planning purposes and the relation this might have with the direction of the participants' gaze in a signed and spoken interaction.

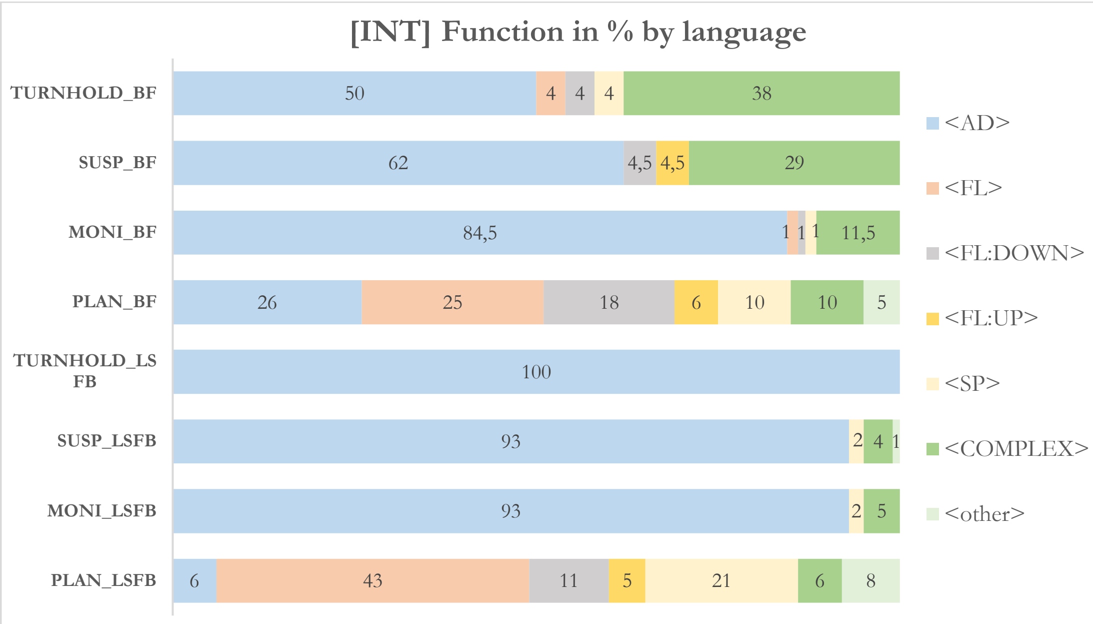


Fig. 86: Distribution in percent of gaze directions with interactive holds in BF and LSFB.

The fact that addressed gazes represent the primary direction for three of the main interactive functions (viz., turn-hold, suspension, and monitoring) makes sense given the primary needs these functions fulfill in the ongoing interaction. They all refer to the good preservation and regulation of the speaker/signer-addressee relationship aiming at the smooth unfolding of the conversational exchange. Moreover, it is logical as well that this <AD> category is not typical of the planning function in both languages, given the nature of the planning function as a cognitive activity that typically raises floating types of gaze instead (Goodwin & Goodwin, 1986), especially during the first stage of word searching activities (Streeck, 2009). The only exception to this general observation is when utterance suspension occurs within a collaborative planning activity and where an addressed gaze type is observed instead (see the examples discussed in section 3.4.3.3 below).

After presenting the overall distribution of holds' major interactive functions in LSFB and BF and their relation to the different types of holds (S1, S2, and S3) as well as the co-occurring gaze directions, the upcoming sections focus on how these four major interactive functions occur in each language. There is a subsection for each interactive function providing examples, first in LSFB, and in BF, next.

3.4.3 Holds with specific interactive functions in LSFB and BF

The next subsections of the analyses focus on illustrating particular instances of holds' interactive roles in SL and SpL interactions. The examples are drawn from the three corpora under study and are presented according to the four primary functions, namely, turn-holding, suspension, planning, and monitoring in each language. These cases will shed light on how holds can carry different kinds of interactional meaning and participate in the management of social interaction in a given SL and SpL. Each time a hold occurs on a manual gesture in the example, the hold segment is underlined (e.g., **<PALM-UP> (909 ms)** indicates that a PU is on hold for 909 ms as in (22)).

3.4.3.1 Holds for turn-holding in LSFB and BF.

In the example below, S001 and S002 are discussing new approaches as regards the development of new pills in the United States that will replace the implant in the future. S002 is telling S001 that research is still ongoing and that it is not ready yet. S001 responds that it is indeed better than the implant and performs the two handed PU displayed in Fig. 87. This PU is intended for obtaining some sort of reaction from S002 (function: monitoring). Then, that PU is held for 909 ms during the entire S002's response to S001. This hold at the end of the turn on the PU, with both hands on the stage in midair position, can be construed as a way for S001 to show S002 that she is not relinquishing her signing turn yet and that as soon as she is done with her response, S001 is going to resume signing.

(22) S001: STILL BETTER PT:DET LESS IMPLANT **<PALM-UP>**
It is still better than the implant.

Fig. 87: <S1:EN> for TURN-HOLD in LSFB, Task 04, S001 (04:57.134 - 05:00.644).

When producing this hold at the end of her utterance (picture 6), it can be expected that S001 is going to bring her hands back to rest position, which indicates turn completion (as illustrated and discussed in Chap. 3, section 6.2.1). Instead, S001 keeps her hands in the location, handshape and orientation from the preceding PU, which is not released until S002's response has become deemed as relevant by S001. Moreover, S001's gaze direction toward S002 is sustained throughout the entire realization of S001's hold.

Therefore, in the present case, S001's hold does not function as a simple turn-yielding device as the signer maintains her role as primary signer soon after the hold release, no change in speakership is noted. This hold is not released prior to S002's response, which would be the case if S001 indicated turn completion. Instead, this example seems to highlight "the interplay between hold release and recognizability of courses of action" (Groeber & Pochon-Berger, 2014), in which the hold is retained throughout S002's responsive action.

Hence, S002's responsive action is composed of a single two-handed PU. What is illuminating here is the precise temporal coordination of S001's hold with S002's response, the PU. As S002 raises her hands to show S001 some acknowledgement, S001 does not release her hold yet, so her hold overlaps with S002's response. Now, S001 does not release her hold at random. This phenomenon, as highlighted by Groeber and Pochon-Berger (2014), shows that "the timing of the release is based upon the current speaker's meticulous on-line analysis of the co-participants conduct" (p. 9), which the authors pursue further, the "hold release is key to understanding the interactional job that the hold performs" (p. 10). In this instance, the hold release does not occur until S001 has visibly acknowledged and recognized S002's action, that is, S002's response in the shape of the PU. In other words, the release of S001's hold can thus be construed as embodying S001's understanding of S002's response, as it takes place after her PU. It is only when S002's hands go back to rest position after having articulated the PU that S001 resumes signing, and moves on to the next topic. This particular example highlights that S001, by making use of her hold, knows what to expect. First, in terms of "what should come next as relevant action (e.g., an answer to a question)", and "in terms of specific content implemented through this action (e.g., the appropriate answer)" (Groeber & Pochon-Berger, 2014, p. 9).

Now, how is this function of hold deployed by BF speakers? The following example has been chosen for echoing to some extent the IFE-G explored in chapter 4 of this dissertation. These types of index have been reported (see section 5.3 of Chap. 4) as reduced forms of IFE-Gs (only the index is in motion) performed in the locutor's lower space where only the index finger is discreetly extended. Two types of uses were identified for these reduced IFE-Gs: first, as a way to provide feedback and second, as a way to display for the locutor a signal, indicating speakership.

In the following instance, the two speakers are talking about cultural differences that exist between the Flemish and the Walloon in Belgium. The speaker on the right, F003, has just told the speaker on the left, F004, about the photographic style of a Flemish photographer she knows, which appears to be more characteristic and typical of the Flemish art of photographing. As soon as F003 finishes her anecdote, there is a pause of 919 ms before F004 raises her right index – as displayed in Fig. 88 – to bounce back on what F003 has just explained and adds: "what you are telling me makes me think of an interview I once heard about the painter, Paul Charlier". She maintains her index finger in that position for approximately five seconds and does not release the hold until she has not finished conveying her point to F003 about the painter she is talking about. As such, once she has uttered the name, her hand goes back to rest position.

(23) F004: (.h) yes I m/ this/ what you're saying makes me think I once heard an an interview of of (**IFE-G 5103ms**) Paul Charlier

Stroke (IFE-G) **<S1:EN> (5103 ms)**

Fig. 88: <S1:EN> for TURN-HOLD in FRAPé, Task 04, F004 (03:43.630 - 03:50.320)

In line with Cibulka (2016) and Groeber and Pochon-Berger (2014), I argue that this kind of bodily behavior (first, the small IFE-G and next, the hold), no matter how discreet it may look, is not performed at random and neither is its release. Rather, these forms of manual actions remain visible for the speaker and the addressee to be recognized, as highlighted by Cibulka: "regardless of whether they are done in a deliberate way [...] such movement are still visible and public and can provide those who happen to see them with an indication of what a participant is currently involved in" (2014, p.19). In this case, this discrete use of the index and its subsequent hold tell the addressee something: that F004's idea has not been completed yet and in this way, F004 shows that she is maintaining her role as primary speaker.

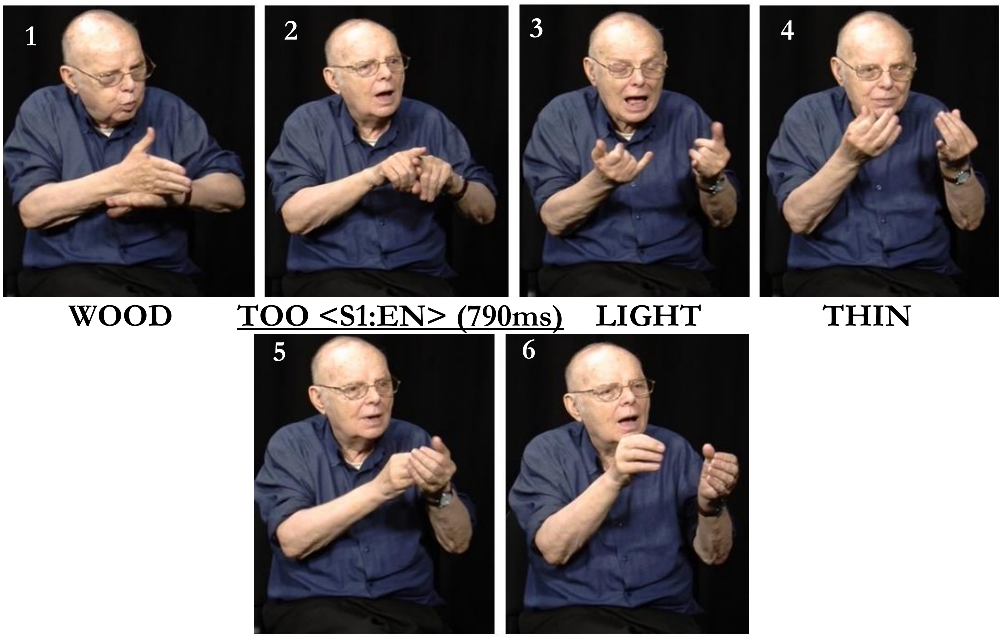
3.4.3.2 Holds for turn suspension in LSFB and BF.

Yet, other scenarios than holds as a turn-holding strategy (viz., the primary speaker/signer holds his/her turn with an intention to keep it as it is without any interruption led by the addressee) may also take place in the regulation of turn taking in the LSFB and BF datasets. Such moments when the addressee intervened into the main line of action resulted in pushing the primary signer/speaker to suspend speakership in order to enable the addressee's contribution or comment. Thus, overlapping signing or talk emerges when the addressee jumps in the main frame of speakership, leaving the primary signer/speaker either to ignore the addressee's intervention or to momentarily suspend speakership, as it is illustrated below.

In the following LSFB example, S003 tells S004 how, in the past, many constructions used to be made out of wooden material, including airplanes. S003 is in the midst of explaining this to S004 and producing the two-handed sign for TOO when S004 intervenes to bring details regarding the type of wood: light and thin. S003 repeats these lexical items as a means to acknowledge S004's contribution and then attempts to move on with his story.

As S004 raises his hands in space to make his contribution to S003's utterance, S003's hands freeze retaining the orientation, location, and handshape of the end of the lexical sign TOO (duration of the <S1:EN>: 790 ms). This hold is released when S004's contribution is deemed sufficient by S003. At the end of this sequence, S003 wishes to resume his story and does so by maintaining his hands on stage and by producing the sign for AND accompanied by a repeated GSIGN to redirect S004's attention to him (pictures 5-6 in Fig. 92). Although S003 initially keeps eye contact with S004 by looking at him, his gaze changes as S004 jumps in by closing his eyes (along with a head nod) as an indication of marking agreement with S004's suggestion. As Cibulka pointed out, "this shift in gaze direction indicates that [the signer] has registered [the addressee's] inquiry and is now involved in an additional activity" (2016, p. 457). Soon after this, S003 redirects his gaze by looking back at S004 (picture 4).

(24) S003: WOOD **TOO (790ms)** LIGHT THIN AND GSIGN
There were more wooden objects before. The wood has to be light and thin, and...



WOOD <u>**TOO <S1:EN> (790ms)**</u> **LIGHT** **THIN**

AND **GSIGN**

Fig. 89: <S1:EN > for SUSP in LSFB, Task 15, S003 (06:11.746-06:15.206).

As overlaps occur in LSFB, how is this managed in spoken BF? The following example from the CorpAGEst Corpus illustrates how overlapping talk results in the suspension of the speaker's turn (C003) and the freezing of her PU gesture to allow the addressee (viz., her granddaughter) to make her comment. C003 is telling her granddaughter that after playing pétanque with some of her friends, her whole body is sore. As she is about to add something to this statement, her granddaughter has already jumped in to make a comment that pétanque "is a lot of exercise", which overlaps with C003's first PU gesture (pictures 1-2). This overlap caused by the addressee makes C003's PU gesture freeze for 405 ms. The repair of this sequence is initiated once the addressee finishes her comment, which coincides with C003's partial retraction phase (picture 3) and resumes her utterance by repeating the exact same gesture, a PU, and restarts her speech with the same word she uttered before her granddaughter's interruption "now" and completes her utterance:

> **(25) C003**: <u>Now **<PALM-UP> (415ms)**</u> (.) now <PALM-UP> you feel like you're getting old.
>
> **Addressee**: That's a lot of exercise, huh?

<u>**Stroke (PU)**</u> <u>**<S1:EN> 415ms**</u> **Partial retration** **Stroke** **Return**

Fig. 90: <S1:EN> for SUSP in CorpAGEst, S3, C003 (01:18.081-01:21.301).

These short interventions by S004 in Fig. 89 and the addressee in Fig. 90 shed light on the multiple back-and-forth that characterize spoken and signed conversations. More particularly, such examples make visible the case of a manual hold allowing the insertion of a sequence (S004's and the addressee's intervention) into a main line of action (S003's and C003's story). Furthermore, in keeping their hands on hold in midair position, both, speaker and signer, show that they have not completed their utterance and therefore, not abandoned speakership. It is also visible that in keeping their hands on hold, both participants in each example acknowledge their addressee's contribution as a point aside the main line of action, which is "interruptive to or inserted into [his] anecdote rather than as the beginning of a completely different activity: In this way, [they] manage to put aside [their] own project for the moment while allowing [their] coparticipant to contribute" (Cibulka, 2016, p. 460).

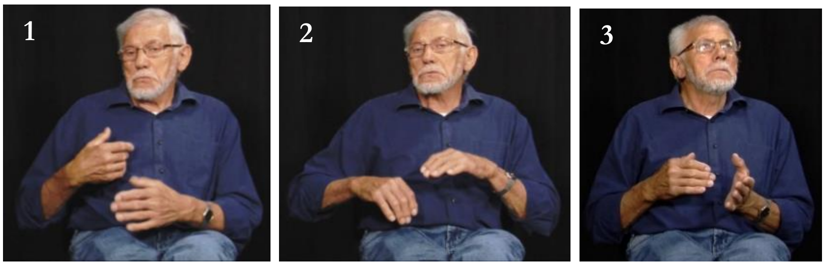
Moreover, these instances presented reveal an important and relevant difference occurring within the turn-taking system. If the hold performed by both signers (S001 in (22) and S003 in (24)) and speakers (F004 in (23) and C003 in (25)) were to work as a unique turn-yielding mechanism, then the subsequent unfolding of the line of action would result in the immediate release of the signer's and speaker's hold as the next participant directly takes over the turn. This is not the case in neither of the examples presented above. Instead, the hold is maintained and its release is not random thanks to the locally fine-tuned online coordination and monitoring of the signer/speaker-addressee relationship.

3.4.3.3 Holds during word searching activities in LSFB and BF.

There are times, however, during conversations when individuals may suspend their utterance to search for what they wish to convey to their conversational partner. Such a phenomenon, as a result, imply that the manual articulators may freeze in space for a certain lapse of time, thereby conveying "imminent continuation of their discontinued utterance" (Cibulka, 2016, p. 454). This type of hold with a planning function represented 30% of all interactive cases of holds in LSFB *vs.* 44% in BF. The following instances illustrate such organizational sequences of the momentary suspension of a sign, as a way for the signer to display a moment of self-reflection during word searching activities along with the interactional implications of a joint word searching activity involving the signer and the addressee in a collaborative fashion.

In the excerpt presented below, the signer (S004) is telling his addressee, S003, about the time when he had his house built. During his story, after he produced the sign for BUILD, S004 displays a two-handed hold occurring at the beginning (<S1:ST>) of the sign for ONE THOUSAND that lasts for 805 ms (Fig. 91) before completing the rest of the date 1966:

(26) S004: PT:PRO1 BUILD **<u>1966 (805ms)</u>**
My house was built in 1966.



PT:PRO1 **BUILD** **<u>1000 <S1:ST> (805ms)</u>**

Fig. 91: <S1:ST> for PLAN in LSFB, Task 04, S004 (06:19.906-06:27.789).

By performing this initial hold and by directing his gaze away from the main signing stream, looking upward, S004 shows S003 that he is currently making a cognitive effort in attempting to find the exact date when his house was built, trying in this way to recollect the right information for S003. As soon as he finds the date, S004 resumes signing.

In BF, speakers also experience conversational trouble as illustrated in word-finding activities. Therefore, speakers self-monitor their own utterances by examining their own speech and by attending to their own gestures, which most of the time may result in their suspension. The following example shows an interesting complex sequence illustrating a planning activity. The sequence is composed of three consecutive holds accompanied each by three different kinds of speech phenomena, including an hesitation marker "euh" (hold 1), an unfilled pause (hold 2), and a self-repair **<u>"o/of a movie"</u>** (hold 3).

In the example below, the speaker, F002, is talking about the exchange she has with her children on the internet, and she is about to tell F001 that she is closer to her son, in particular, when it comes to "exchanging about a movie or else" (F002's words). But before she reaches to finding the target words "exchange about a movie", she is going through a number of stages that result in various manual suspensions and speech disfluencies.

The first time the manual suspension occurs is when she utters the word "affinity" and leaves her hands for 718 ms (<S1:EN>) in the exact handshape, location, and orientation as the previous gesture stroke. This hold appears in synchrony with the hesitation marker "euh". Then, something interesting happens. As she is still unable to retrieve the missing word, she produces a second hold with a body shift by leaning slightly backward in her seat. This body shift does not occur at random. As pointed out by some researchers, "the transition from one body posture to a more relaxed one reflects the participant's local understanding of a sequence [...]. Such a transition is publicly available and constitutes a resource for structuring the flow of interaction" (Cibulka, 2015, p. 19), in this case, the word search.

Next, between the second and third hold, she finds what she means by producing the word "to exchange" (dialoguer) but then, she performs a new gestural hold <S1:EN> of 516 ms as she is trying to correct herself by replacing "o/" by "of" before she retrieves the correct word for "movie". The sequence closes as she has found the word, has gazed back at her addressee, and can now resume gesturing and speaking fluently.

Throughout the sequence and until the last moment marking the end of the search activity, F002's gaze is turned away from the addressee, revealing a floating gaze that is looking downward and that is centered toward herself. As indicated by Goodwin and Goodwin (1986), speakers frequently tend to withdraw their gaze away from their addressee when they are involved in word searching activities. The authors mention that such gaze directions tend to take place close to "perturbations in the talk displaying initiation of a word search" (p. 57).

The speaker mobilizes a combination of various bodily behaviors, namely, the manual hold, the gaze direction, and the body shifting as part of the same organization sequence that manages the word finding activity. All of this provides certain cues for the addressee as regards the current status of the ongoing interaction: that F002 is currently retrieving from the main line of action – without giving up her speaking turn – to search for what comes next to formulate her utterance.

(27) F002: The one I feel the closest to (.h) uh (718 ms) exchange of of (969 ms) a movie or or (516 ms) something

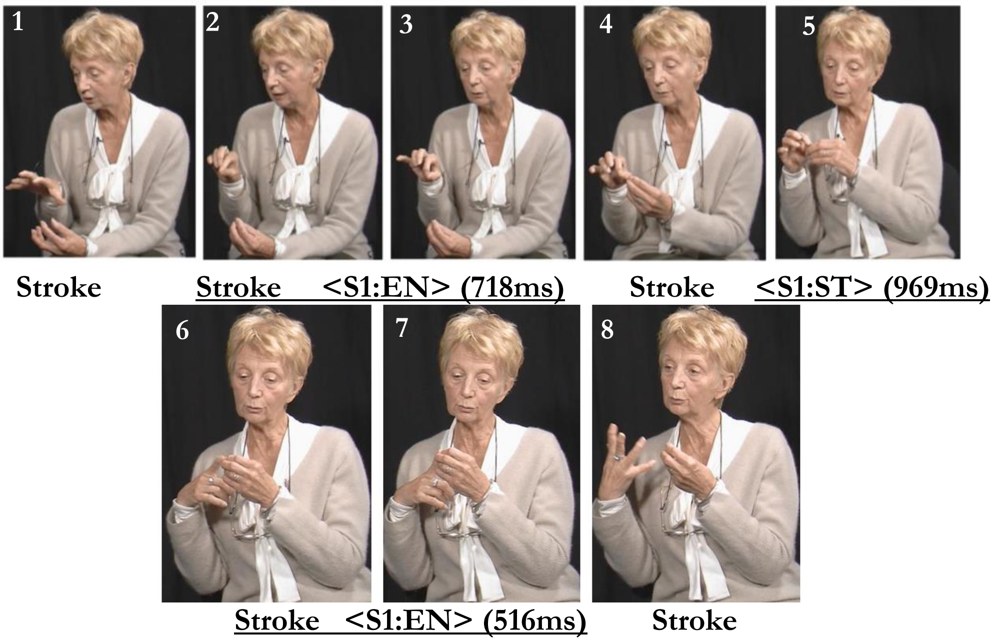


Fig. 92: <S1:ST> and <S1:EN> for PLAN in FRAPé, Task 20, F002 (03:23.695-03:30.212).

In these two instances, (26) in LSFB and (27) in BF, the word search qualifies more as a non-collaborative activity in that the addressees, S003 in (26) and F001 in (27), do not interrupt nor participate in the word search but simply wait patiently for S004 and F002 to remember the missing piece of their utterance. Yet, this is not always the case and planning can be seen as a collaborative activity.

Consider the following instance where the signer's word search differs from S004's insofar in (26) as she does seek help from her addressee, S001. In this example, S001 and S002 are jointly engaged in a word search activity, or rather S002's utterance suspensions make S001 join the word search. In this example, S002 is talking about past kitchen amenities and, in particular, how past kitchen stoves used to work with charcoal. But as S002 wishes to convey this idea, she has difficulties recalling the sign for COAL. A difficulty that is going to be expressed through the use of a series of different manual holds, which are going to serve as an invitation to S001 to actively take part in the process of providing the missing item. This is what is going to happen, after a number of failed attempts at finding the sign for COAL), S001 shows S002 the correct sign for it (see picture 8 below).

I now turn to a few points of attention in this example as regards the series of holds deployed by S002, and the effect they have on S001's line of action. The first hold emerges as a hold occurring in neutral space in front of S002's body (<S2:NE> for 308 ms) after the production of the locative pronoun (PT:LOC, in picture 2) without yet adopting the handshape of the sign for COAL. S002's eyes are closed as her hands slowly move toward the realization of the sign for COAL. Yet, as she is about to perform the correct sign, her hands stop at the beginning of it (<S1:ST> for 534 ms) as a signal of her hesitation (picture 4), and slightly change their orientation (picture 5) and remain motionless for 434 ms in front of her (<S2:NE>). This last hold is accompanied by an interesting floating up gaze direction that, in addition to the manual hold, adds meaning to the status of the word search activity: still pending. Then, S002 is going to change tactics and she articulates the sign for kitchen STOVE as a way to provide S001 with a hint for the missing lexical item COAL. S002 is going to repeat the sign for STOVE twice (picture 6), immediately followed by the act of placing once more both of her hands in the shape of the beginning of the sign COAL. This hold is constituted of the beginning of the sign for COAL and a simultaneous mouthing for the corresponding French word "charbon", visible in picture 7.

Following all this information, S001 finally intervenes and shows S002 the end of the movement (picture 8) for the sign COAL, which S002 repeats five times as if to anchor the lexical item into her memory. Once S001 has given S002 the correct missing lexical sign, S002 resumes her story about the kind of stove these kitchen appliances used to be like.

(28) S002: BEFORE PT:LOC **HOLD** (338 ms) **COAL** (534 ms) **HOLD** (434 ms) STOVE+ **COAL(5x)** (301 ms)
Do you remember charcoal stoves?

S001: COAL
Charcoal, yes.

BEFORE **PT:LOC** **HOLD(338ms)** **COAL(534ms)** **HOLD(434ms)**

STOVE+ **COAL** **COAL** **COAL (301 ms)**

Fig. 93: Utterance suspension during a joint word search activity in LSFB, Task 15, S001 (07:02.554-07:09.059).

The two LSFB excerpts illustrated signers whom, by suspending their signing production, could signal to their addressee different kinds of utterance information. In the first scenario, S004 indicated that by averting his gaze direction and holding his hands on the beginning of the sign for 1966, he needed a moment to recollect the exact information from his memory, on his own. By contrast, in the second extract, S002 is looking for her words but at the same time, she is soliciting the addressee to intervene in her word search.

The last example of this section on planning part of the utterance and how manual holds are part of this process is presented in (29). More particularly, this case shows how the speaker in the FRAPé Corpus, F004, is trying to find her words to explain to F003 how the readings in her book club are arranged between the members of the group. As she is trying to tell F003 that everyone reads the same book and then discuss it, she stops after uttering “we all read”, there is an unfilled pause in her speech of 0.5s, and her hands freeze in midair position for 690 ms. The manual suspension along with the disruptions in her speech and the addressed gaze are visible cues that tell her addressee she is having word trouble, which results in F003’s intervention who suggests the following words “the same thing”. As her addressee begins to say those words, F004 directly completes her utterance by releasing the hold and by reformulating F003’s words more specifically: “the same book”, and then resumes telling her story.

(29) F004: We all read (.) **HOLD (690 ms)** the same book

Preparation **Stroke** **<S1:EN> (690 ms)**

Fig. 94: Utterance suspension during a joint word search activity in FRAPé, Task 15, F004 (07:23.585-07:27.207).

An interesting aspect here in (29) similar to the LSFB example in (28) but different from (26) and (27) above is the fact that, when the word search consists of a collaborative activity, the speaker’s or signer’s gaze is fixed on the addressee throughout the word searching activity instead of being vague. Gaze direction, therefore, appears as an additional interactive function and as an essential resource for participants to communicate further information to the addressee.

Despite the differences in the kinds of holds deployed and the formal aspects observed in these instances above, participants (speakers and signers) still signal to their conversational partner that, by keeping their hands in midair position, the main line of action is soon resuming. These types of holds serving a planning function, therefore, do not indicate turn completion nor turn withdrawal by the first signer/speaker. Rather, these instances bring out how participants deploy certain manual and non-manual strategies such as holds and gaze direction in word searching activities, which indicate to their respective addressee that they are planning parts of their utterance. Not only are speakers and signers self-monitoring their own utterances by withdrawing for a moment from the main line of action to think or recall the target word (as in S004's gaze aversion and hold and C003's body shift, leaning backward) but they also come to seek help from the addressee, making the planning activity more communicative and interactive (as in S002's and F004's sequences).

These brief instances discussed within this dissertation's framework, which admittedly does not address disfluency issues in SpLs and SLs, still provide compelling qualitative evidence that the planning process in speakers and signers can be "self-oriented, therefore more DISfluent [...] or other-oriented, more communicative, contributing to the fluency of the interaction" (Kosmala et al., 2019, p. 5) and support previous findings in this line of work (see Graziano & Gullberg, 2013, 2018; Kosmala et al., 2019; Notarrigo, 2017; Seyfeddinipur & Kita, 2001).

3.4.3.4 Holds for seeking attention and understanding in LSFB

Conversations do not merely consist of one speaker/signer expressing himself/herself on one end of a continuum, and addressees trying to make sense of those expressions on their own, on the other end. Instead, dialogical exchanges are to be conceived as bilateral exchanges where each participant, speaker/signer and addressee, is active and receives a role to play. One of those roles is to monitor. This role does not consist of monitoring only the speaker/signer's actions by the addressee but it also constantly involves the monitoring of the addressee's understanding and attention by the speaker/signer. In turn, addressees become involved in the dialogic exchange by keeping the speaker/signer up to date of "their current state of understanding" through various means such as feedback expressions (Clark & Krych, 2004, p. 62).

The function of monitoring has been acknowledged in previous instances of gesture use in this dissertation. For instance, in chapter 3, section 6.3.2.3, C001 articulates a left-handed PU gesture directly toward her daughter. This PU case has been argued to serve a monitoring function because the speaker is checking for understanding and attention from her daughter. Additionally, this function has also been acknowledged in chapter 4, section 6.3.2.1 for an IFE-G produced by F001 in the FRAPé Corpus (to cite only two examples). These cases of monitoring through gestural moves concur with previous research as regards the act of "other monitoring" by speakers and signers through various means, including gestures (Clark & Krych, 2004). Now, my argument here stemming from the results is that it is also possible for speakers and signers to monitor their addressee closely, that is, checking attention and understanding as well as seeking following, with holds. The following examples illustrate such a claim by providing some evidence that the cessation of manual movement does not mean nor imply the cessation of the smooth unfolding of the ongoing interaction.

The sequence presented here in LSFB represents a continuation of the example discussed in 3.4.3.1, this section. S002 is telling S001 about the effects those pills would have on the internal structure of the inner ear. She claims that they would make it possible to grow back cilia, inside the cochlea. As she is talking about anatomical terms, S002 is going to clarify what she means by the cochlea by making a comparison with its shape, viz., the part that looks like a snail:

(30) S002: PILL.MEDICINE IN-1H PT:LOC+ LIKE **[SNAIL (1280 ms)]** CILIA

Those pills would make it possible to grow back, inside the ear, inside the cochlea, you know the part in snail-shaped, cilia

S001: [mm mm]

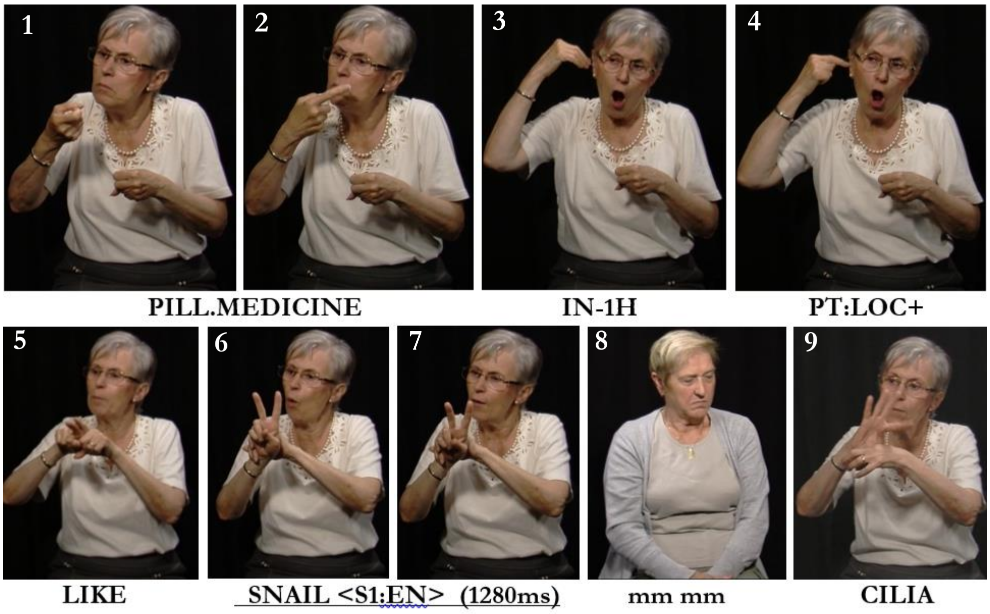


Fig. 95: <S1:EN> for MONI in LSFB, Task 04, S002 (04:30.703-04:38.777).

As S002 produces the sign for SNAIL, she is going to freeze her hands for a bit more than one second (1280 ms) to ensure that her addressee, S001, understands what she is talking about. The fact is that S002 suspends her own signing production thereby attending to her addressee's needs, viz., her smooth following of the conversation and understanding of the topic. An additional note regarding S002's gaze is the fact that throughout the sequence, she has not ceased looking at S001 to ensure the good reception of her talk.

Acknowledging that the hold is directed at her, S001 keeps S002 informed of her status by producing a head not as feedback in sign of understanding at that moment. Once more, the fine-tune association of the hold and its release are temporally coordinated with the moment when S002 has visibly recognized S001's feedback as confirmation she is following and understanding. It is only when S002 has received such information that she releases the hold and resumes signing. In this case, the hold is seen as serving a monitoring function and not as a turn-hold strategy given the fact that the hands stopped in mid-utterance production and not at the end of the signer's turn, as it is the case with S001 in (22). As a matter of fact, both holds' release bear similarities in the timing of their unfolding but the holds themselves differ in that the one presented in (22) possesses a stronger projectional strength. Groeber and Pochon-Berger (2014) discuss the projectional strength of an utterance, in which a "strong projection is operated by a question that projects an answer whereas a compliment has lesser projectional strength", for example (p. 11). The hold in (22), thus, has a stronger projection for occurring at the end of a turn, projecting an answer, than the hold in (30), which occurs in mid-utterance position in the end of the sign by S002 to ensure S001's smooth understanding of the situation.

The CorpAGEst speaker, C004 is telling her granddaughter, the addressee, the conversation she had on the phone with one of her family members who told her he hoped she still played the piano. On that note, she tells her granddaughter that for a while she was not able to play the instrument anymore because of her fingers that were too swollen. This sequence is marked by a very interesting way for the speaker to establish and sustain joint attention through her use of gestures and, in particular, gestural holds as a way for her to check for attention and understanding (viz., to monitor her addressee):

> **(31) C004:** Because at some point I couldn't eh (.) (751 ms) my fingers were closed eh (.) (516 ms) look (.) (1247 ms) well this one was [big like that] (.) you see (1980 ms)?
>
> **Addressee**: [yeah yeah]

Fig. 96: <S1:EN> for MONI in CorpAGEst, S3, C004 (03:46.891-03:57.305).

The first hold (<S1:EN> for 751 ms) occurs when the speaker brings her right hand in the position to make a first attempt at establishing joint attention with the addressee (pictures 1-2-3). She is trying to solicit her granddaughter's attention and reaction by looking at her while producing this first gestural hold (lasting for almost one second), which is also reflected in the discourse particle "eh" to get a reaction at the end of this first segment. As she does not succeed in obtaining the addressee's attention, she resumes her anecdote by producing a second gestural stroke (picture 4) and by maintaining the end of this gesture for 516 ms, trying to capture her granddaughter's attention, without success (picture 5).

The figure below displays the non-addressed gaze of the addressee to her grandmother. Instead, her gaze is directed at the interview sheets next to her, and she does so for almost the entire duration of C004's utterance (picture on the left, Fig. 97) until the speaker has uttered the explicit word "look" to get her addressee to finally look at her fingers, which she does for barely two seconds (picture on the right, Fig. 97) before averting her gaze again:

Fig. 97: Illustration of the addressee's gaze aversion looking at the interview sheets in CorpAGEst, S3 (03:47.781-03:54.155)

Therefore, for the rest of the sequence in Fig. 96, C004 brings her left hand to make her addressee look at her fingers and sustains this gesture at its end for 1247 ms as if to wait for her granddaughter to agree and/or manifest that she has been following what has been said. Finally, C004 obtains some minimal affirmative feedback "yeah yeah". As soon as C004 has received her granddaughter's response, she understands this as a signal that she is following and, therefore, releases her holds to produce another gestural stroke. The sequence ends on the speaker trying one last time to get her granddaughter to attend to her gesture (pictures 8-9). This time, C004 utters the words "you know" at the end of her utterance simultaneously to her gestural hold of almost two seconds (1980 ms) to prompt the addressee's reaction, who gives another feedback in the shape of a minimum response type: "mm" to her grandmother.

In this last example, the monitoring of the addressee represents a strenuous task for the speaker, for whom cooperation with her granddaughter in the dialogic exchange seems difficult to create and maintain. Indeed, the addressee does not attend to the speaker's speech nor gestures. This, in turn, results in the production of several manual holds and other discourse particles such as "eh" and "you know" as attempts in seeking the addressee's attention. In this specific example, it is obvious that the speaker takes her addressee's eye gaze aversion as a disruptive element she needs to attend to for the smooth unfolding of her story. As corroborated by Krych and Clark's claim: "speakers monitor their addressees' eye gaze, and when the addressees are not gazing in return, they may alter the course of their utterances to obtain the return gaze (Goodwin, 1981)" (2004, p. 64). This is visible in the number of monitoring strategies developed by C004, as mentioned.

3.4.4 Summary of main findings for interactive holds in LSFB and BF

The overall tendencies revealed that the majority of holds were final ones in LSFB and BF while the least frequent category was initial holds in both languages as well. There were more holds occurring in neutral space in front of the participant's body in LSFB than in BF. No floating index holds were found in the BF datasets, underlining this type of hold as a specific aspect of signed discourse. At the level of the participants, signers on average produced more holds than speakers did. Moreover, digging into the results by corpus shed light on an important degree of intra-individual variation, especially in CorpAGEst (mainly due to the almost absence of holds by C002.

This finding can be put into perspective by the fact that the interview setting design for the LSFB and FRAPé Corpora differs from the CorpAGEst's setting. By that, it is to be understood that the semi-directed nature of the interviews in CorpAGEst may have affected the apparition of gestural holds, which, in this dissertation's framework, are examined according to their interactive roles in the participant's conversations. Yet, in CorpAGEst, while this dialogic dimension is in part respected (viz., there is a speaker and an addressee, face-to-face), the interview design still presents the characteristics of a free type of exchange to a lesser extent than what the speakers in FRAPé and signers in LSFB experience. In other words, in CorpAGEst, there is the older speaker answering the questions formulated by the addressee, who acts as the main moderator inside the exchange itself while in the other two corpora, there is a third actor regulating the exchange between the dyad interacting, from outside. I hypothesize that the freedom left to the addressee to jump in at any moment in conversation may have played a role in the production of manual holds.

In line with this, another factor that was examined that could have played a role in the number of holds was the fact that the more a speaker' or signer's hands were on stage (Cibulka, 2016), that is, perpetually on the move in space, the more occasions there could be for holds to occur. Results of the Pearson's correlation indicated a significant high positive association between the number of gestures/words and the number of holds in BF, suggesting that the more speakers gestured/spoke, the more holds they produced. Whereas the results in LSFB showed a moderate positive relationship between the number of signs and the number of holds but not statistically significant, which revealed no correlation. While no causality can be established with correlations, these results nevertheless suggest that manual holds are more strongly associated with the gestures and the words speakers produce than with the manual signing stream. However, further research needs to be conducted on vowel-lengthening phenomena in speech and the presence of holds in signing in order to provide a more comprehensive picture of such association between SpLs and SLs.

The analyses yielded interesting results as regards the interactive functions of holds in LSFB and BF. First, four interactive functions were singled out for holds. These four functions appeared in each language, BF and LSFB, as the primary interactive roles for holds. In LSFB, holds were found to be used primarily when the main signer suspended his/her turn due to the addressee's interruption into the main frame of speakership (viz., suspending, 40%) as well as for planning and monitoring purposes (30% and 26%, respectively). Only 1.5% of all interactive holds were found to carry a turn-holding function in LSFB (*vs.* 8% in BF). In BF, the planning function of holds was the one that stood out as the main interactive function of holds among speakers (43%), closely followed by the monitoring function (39%). A bigger contrast emerged as regards the function of turn suspension between BF and LSFB, for which only 6% of holds in BF received such a role. This can be partly explained by the higher presence of overlaps in the discourse of LSFB signers than in the discourse observed in the BF data. Once more, the fact that less overlaps are found in the discourse of BF speakers is related to the design of the interviews, especially in CorpAGEst, where the addressees do not jump in whenever they want to interrupt the primary speaker and take the floor. The results regarding the interactive functions of holds in each corpus are summarized in a table in the appendix, along with those of the PU and the IFE-G.

Gaze directions also revealed interesting insights into its tight association with interactive function of holds in LSFB and BF. A first striking point was that gaze was more stable in LSFB than in BF during the production of all interactive holds, except for the planning function where various gaze directions were observed. These different gaze directions for planning purposes between LSFB and BF could be due to the type of activity the participants were engaged in during planning parts of their utterances. For instance, when signers and speakers were involved in the narration of an anecdote and suspended their utterance, they looked at a particular point in space whereas when they experienced trouble in finding their words, they were more inclined to display floating gazes to recall the missing word. Therefore, it would be interesting in a future study to look at the type of activity involved during utterance suspension for planning purposes and the relation this can have with the direction of the participants' gaze in a signed and spoken interaction.

Looking at two specific interactive functions, monitoring and planning, and their associated gaze directions, the former is predominantly marked by addressed (84.5% *vs.* 93% in LSFB) and complex gazes in BF (11.5% *vs.* 5% in LSFB) but also includes some floating gazes (3% *vs.* none in LSFB). By contrast, the latter shows more variability in including all kinds of gaze directions in both languages. Yet, with respect to the distributions, there is a greater number of planning holds in BF that are addressed (26%) while this represents a minority in LSFB (6%). Instead, the majority of gazes for planning purposes in LSFB are regular floating gazes (43%), followed by downward (11%) and upward (5%) floating gazes.

4 Preliminary Conclusions

Throughout the different chapters of this dissertation, the ways individuals – speakers and signers – keep moving their hands for a plethora of reasons during their conversations have been reviewed and discussed. Among the reasons, people move their hands adopting a particular location, handshape, orientation, and/or movement when they wish to draw someone's attention at a particular object or person by pointing (as covered in Chap. 4 on the IFE-G). At other times, they are engaged in the act of gesturing, as with PUs, because they want to express their inner feelings and attitudes, or include the addressee into the conversational flow (as exposed in Chap. 3 on the PU). The point is that these different aspects of manual movements involving the actual motion of a sign or a gesture are very often the point of focus in the majority of studies. In other words, the stroke of a sign or gesture remains the center of attention. Yet, people do not always move. Sometimes body articulators such as the hands freeze during utterance production.

This chapter has taken under consideration such understudied aspects in the fields of gesture and SL research. Not only have I considered these moments of gestural and sign suspension as meaningful, but I have also argued for their relevance and importance at the level of the management of social interaction, for both signed and spoken language conversation. The main question throughout this chapter has been to guide the reader in discovering what these moments of non-movement in a signed and spoken interaction mean, and how their investigation contributes to a better understanding of different aspects of human communication and social interaction.

Taking these elements into account, the manual holds investigated in this chapter have revealed themselves to serve as a fundamental resource that speakers and signers can draw on to regulate their interactions, "rather than as failures or incomplete signs" and gestures (Cibulka, 2016, p. 459). Speakers and signers have mainly deployed holds as interactive strategies when turn-regulating mechanisms are at play (e.g., turn-hold or suspending) as well as to display a constant "on-line" monitoring of their addressee and their own utterance productions (e.g., planning). In particular, delving into the interactional world of these holds in this chapter has allowed exploring the subtle cues that participants deploy to manage the level of intersubjectivity in their conversation, which displays the participant's "attention to the addressee as a participant in the speech event, not in the world talked about" (Traugott & Dasher, 2005, p. 22). As a result, intersubjectivity stems directly from the interaction of the speaker with the addressee and in doing so, participants "attempt through [their] conversations to develop intersubjective meaning contexts with others that will facilitate an even greater level of mutual understanding" (Ickes & Dugosh, 2000, p. 162). From the results, it can be suggested that speakers and signers achieve a certain level of intersubjectivity in their dialogic exchange on a moment-by-moment basis through manual holds.

Functioning as embodied resources available at all times for the participants, holds "make publicly available on the spot one's current expectations and understanding of mutual conducts, [which] are emerging in and from interaction". Furthermore, holds "respond to local contingencies and are therefore continually revised and changed within the talk-in-progress" (Groeber & Pochon-Berger, 2014, p. 14).

Moreover, addressing this phenomenon side by side in a spoken and signed interaction shed light on a number of compelling and challenging issues. First, the results outlined in this chapter allowed establishing a number of parallels between the two languages. While their distributions differed, four primary interactive functions were found to characterize the use of holds by LSFB signers and BF speakers. Interestingly, similar findings have been reported in previous studies conducted on holds in both, SpL interaction (Andrén, 2011; Mondada, 2007; Sidnell, 2005; Sickveland & Ogden, 2012; Streeck, 2007) as well as SL interaction (Cibulka, 2015, 2016; Groeber & Pochon-Berger, 2014; Notarrigo 2017).

A case in point was particularly visible in (22) in LSFB where S001 executed a hold and S002 responded with a PU. Such holds at the end of an utterance are a typical aspect of marking questions in spoken (Andrén, 2011; Cibulka, 2015) and signed conversations (Baker, 1977; Groeber & Pochon-Berger, 2014). When a speaker or signer awaits the addressee's response to a question they ask, they often keep their hands on holds until the addressee provides an appropriate response. The same has been stated for gestural holds in spoken interaction: "when a gesture is held longer than would be needed simply to convey information, it becomes a kinetically held question, that is, a request for response from the addressee" (Bavelas, 1994, p. 203).

Furthermore, the results have also briefly underlined in several instances the valuable roles of other bodily resources, including eye gaze and body shifts, which provide additional meaningful information to the holds executed as part of utterance suspension. As a matter of fact, manual movement, or the lack thereof, merely represents a drop in the range of possibilities available to the body at all times to express meaning. Along these lines, therefore, "even with its most trivial actions the body remains a locus for meaning and maintains an essential rationality; rather than performing irrelevant, inexplicable actions, it provides others with the resources to interpret what it is doing" (Goodwin, 1986, p. 42).

Moreover, examining holds as part of the interactional resources that speakers and signers draw on in their discourse raises the challenging issues of revisiting and rethinking their status. As mentioned previously, holds are not easy to categorize or to study. They pose methodological as well as theoretical issues. Despite its lack of movement as one of its main characteristics, their status remains ambiguous. For instance, dealing with holds bring the fundamental issue of asking – and questioning the relevance – of whether it still forms part of the internal linguistic structure of a sign or not? Is it a linguistic or non-linguistic feature of SL? And if so, what about its status in gesture studies?

In line with the arguments I developed in chapter 1 and following various results (Andrén, 2011; Bavelas, 1994; Cibulka, 2015, 2016; Groeber & Pochon-Berger, 2014) as well as those presented in this chapter on holds, when it comes to the study of social interaction, whether in signed or spoken languages, it becomes almost unnecessary to establish a clear-cut boundary between the linguistic and the para-linguistic. Instead, it is by adopting a holistic approach to social interaction (see Goodwin, 2000; Mondada, 2006, 2007), which advocates for a view where participants rely on semiotic resources available to them "as a whole, independently of their nature, to make sense of their actions" (Groeber & Pochon-Berger, 2014, p. 14). Therefore, it is by letting aside the initial binary distinction between the linguistic *vs.* non-linguistic and by instead encompassing these bodily conducts, including holds, as a whole that scholars discover how individuals in SLs and SpLs choose to draw on similar strategies in specific interactional contexts to manage the flow of their conversations with their partner. Hence, as a final note, following Cibulka (2016): "Such obvious (and perhaps therefore largely overlooked) similarities provide evidence for the fact that interactional systems and practices are partly shared by different communication communities, both in signed and spoken conversations" (p. 467).

CHAPTER 6
Conclusions

Endings and beginnings are merely paired facets of an imagined stone curtain,
behind which a plethora of opportunities await
(Thompson, *Liverpool Poet*)

This dissertation has set out to explore the interactional aspects of specific gestural forms in the spontaneous dyadic conversations of four signers *vs.* eight speakers in the southern part of Belgium. This chapter ends the present dissertation but it also opens up the way for new beginnings. The main contributions on the theoretical and conceptual levels as well as to the empirical work conducted, all of which guided the current reflections, are presented below.

1 A Gesture's Journey as Part of Language

Language is complex in many respects. When conceived as a system that is to be analyzed at all levels of linguistic structure, including phonology, morpho-syntax, and so forth, it is interpreted as a static and abstract phenomenon in which the rules are disconnected from their context of use. However, the ability to *do* language, construed "as [a] situated social practice" (Cibulka, 2016, p. 57), does not exclusively rely on knowing the rules that govern the grammatical principles at work in a given language, nor does it limit itself to understanding the lexical content of utterances. Language is more than that; it is fundamentally social and inherently multimodal in that it enables all humans to create, express, and construe meaningful utterances, in which the body plays a central role. Gesture is one of such key elements participating in this meaning-making process.

Traditionally, the dominant approach to gesture analysis has relied on cognitive and psycholinguistic models (Goldin-Meadow & Brentari, 2017; McNeill, 1992, 2005), which have highly influenced how scholars in the fields of SpLs and SLs have explored gesture in relation to speech and signing. Yet, looking at gesture from this particular angle imposes certain constraints on gesture expression, and exposes a number of shortcomings. One limitation of this approach concerns the exclusive focus on a specific type of gestural manifestation – gesticulation – at the expense of other (more or less) conventionalized gestural phenomena (e.g., recurrent and emblematic gestures as well as other less complex gestural forms). According to this framework, only the imagistic, idiosyncratic gestures created on the spot are apt to reveal the inner processes of people's minds and be representative of their thoughts in action. Advocates of this approach include McNeill (1992, 2005) and his plea for the joint consideration of speech and gesture as two sides of the same process, as well as Goldin-Meadow and Brentari (2017) and their focus on gestures that predict learning. However, studies like these fail to observe gesture as it occurs in naturally occurring conversations. Therefore, as argued, this conception and treatment of gesture only provides an insufficient and partial picture of how language users communicate *in the* *wild*, which, in turn, has ultimately led to a dualistic view that places gesture as mutually distinct from sign.

In the field of sign language research, no consensus has been reached regarding gesture's position and its relation to sign in SL. Several arguments have been reviewed. While Emmorey (1999) claims that signers do gesture but not like speakers, Duncan (2005) argues that signers can produce manual and non-manual gestures just like speakers. Others have raised doubts regarding the status of some SL properties suggesting they rather be analyzed in terms of gestural features in SLs or as gestural and linguistic elements combined (e.g., Liddell, 2003b; Liddell & Metzger, 1998). While these studies signal the increasing popularity of exploring gesture and sign in spoken and signed languages, most of them fail to depart from cognitive models and experimental conditions imposed on gesture performance. As a result, all the possible instantiations of gesture in signed discourse that arise when the full spectrum of gestural phenomena is considered (including the lower limit of gesture; Andrén, 2014) cannot be acknowledged. One of the challenging aspects in the present work has been to counter this bias in research by re-establishing gesture *in* the realm of language.

Several contemporary scholars (Andrén, 2014; Kendon, 2008; Müller, 2018; Shaw, 2013, 2019) have begun to work toward that goal, suggesting that the continuum set by McNeill (1992), in reality, acts more as a gulf between gesture and sign, emphasizing the paralinguistic side of gesture *vs.* the linguistic side of sign. This needs to be left behind in favor for a focus on commonalities shared between the two, a "comparative study of kinesic expression" in Kendon's (2008, p. 360) terms. This dissertation has set out to achieve that goal by reframing the current view of gestures to instead locate them *in* language, moving away from the cognitive models, hoping to add a stone to the bridge across the gulf commonly dividing gesture and sign. As Kendon wrote, it is "only by studying them as they appear within situations of interaction that we can understand how they serve in communication" (2004, p. 48).

By offering a direct, in-depth analysis of interactive gestural components in a signed language on a par with a spoken language (speech+gesture condition; Vermeerbergen & Demey, 2007), this study constitutes a first step toward a better understanding of gesture's relationship to signing and language. In this dissertation, paramount attention has been paid to specific embodied strategies of situated discourse in BF and LSFB, two languages that had not previously been compared cross-linguistically and cross-modally from an interactional point of view. This study, therefore, sheds new light on the roles of gesture in language interaction, including the ways that deaf signers make use of specific gestural means to regulate the flow of their talk with addressees, and how those gestures compare to those performed by speakers in spoken conversations.

I have argued throughout this dissertation that a restricted, binary definition of gesture (gesture *vs.* non-gesture) along with the exacerbation of differences between gesture and sign have reduced the chances of other gestural forms being examined in SLs and SpLs as meaningful constructions that language users draw on. Because of this bias, some gestural practices are completely filtered out from the scope of analysis from the beginning. This unbalanced trend in research is best instantiated in one of the components currently under study, manual holds. In SL research, the freezing of the hands in midair position has often been described as a recurrent grammatical feature in the case of asking questions that require a response (Groeber & Pochon-Berger, 2014). Speakers also make use of gestural holds during conversations. Then, why are they described as part of the linguistic system on the one hand, and as part of the para-linguistic, on the other? The current study has presented further evidence that both signers and speakers resort to a series of shared manual (gestural) forms, including gaze direction, to engage with one another and regulate the flow of their conversational exchanges, revealing in this way the dynamic, systematic, and interactive nature of gesture *in* language.

Following the pragmatic tradition of language as used in a social context, drawing on concepts from interactional linguistics and discourse analysis, and adopting the methodologies of corpus-based approaches to language data, the current work has examined how different views on meaning have driven scholars' understanding of language. Through analyses of the PU, the IFE-G, manual holds, and gaze directions in face-to-face conversations, the current reflection has challenged the analytical status quo that meaning is inherently propositional. This, ultimately, pushes scholars to (re-)consider and include other manual forms (e.g., holds and reduced gestural forms) in the wider spectrum of what gesture is and how it is best construed as a situated communicative practice in language.

The set of units under analysis are drawn from three multimodal corpora of recorded video material of face-to-face conversations in LSFB and BF. Chapter 2 outlined the tools applied in this research for exploring gestures across these two languages and modalities. In previous research devoted to the study of LSFB, not only was it not examined on a par with its spoken counterpart, BF, but also there was no exact replica of the protocol that LSFB signers went through at the time of data collection to conduct cross-linguistic analyses between LSFB and BF. By entirely devoting the analyses to aspects of discourse in the two languages of the French-speaking/signing community in Belgium, and by using a directly comparable parallel corpus of signed and spoken languages (LSFB and FRAPé), this study is the first work ever to be carried out that contributes to this linguistic angle of research on both languages. In addition to the parallel corpus, the incorporation of a third dataset in BF, CorpAGEst, has yielded useful insights into aspects that might not have been visible if CorpAGEst had not been included in the analyses.

In contrast with the treatments that gesture has traditionally received in the literature on SpLs and SLs, the focus here lies on the interactional nature of gesture in language, including the speaker/signer-addressee relationship and the management of talk itself. These marginalized interactive aspects of gesture in spoken and signed discourses deserve more attention and credit as they might constitute (one of) the ports of entry to the road uniting gesture and sign, paving the way toward a more unified vision of language. The next section provides an overview of the main findings.

2 Overview of Main Findings

This study has provided a formal and functional inventory of the PU, the IFE-G, and holds in the discourse of LSFB and BF participants across languages and modalities. By paying attention to the markers' frequencies of use and their interactive functions, along with concurrent gaze directions, this research underlines the different strategies and choices that signers and speakers adopt depending on contextual and interactional demands, allowing them to regulate their interpersonal relationships with addressees and attend to the contingencies of the unfolding talk itself. Chapters from 3 to 5 each analyzes a particular gestural marker, including the accompanying gaze patterns, which, considered as a whole, provides a more comprehensive panorama regarding some of the interactional tools employed by BF speakers and LSFB signers to manage and achieve their particular communicative needs and goals. Each chapter is built according to a similar pattern. Quantitative analyses present the results across languages, corpora, and participants. These analyses are combined with qualitative discussions that allow for a more fine-grained approach to the data, illustrating the overall tendencies emerging from the quantitative-oriented parts.

Sometimes called a "co-sign gesture" (McKee & Wallingford, 2011), the PU has received extensive attention in SpL and SL research. **Chapter 3** offered a different perspective to that of the usual accounts that focus on the analysis of the epistemic variant of the PU in language (Chu et al., 2014; Cooperrider et al., 2018) by expanding the scope of study to include the interactional dimension of the PU's functions in speakers' and signers' conversations. Overall, the analyses in Chap. 3 provided further evidence regarding the pervasive and multifunctional characteristics of the PU reported in previous studies (Engberg-Pedersen, 2002; McKee & Wallingford, 2011; Gabarró-López, 2017, 2020; van Loon, 2012).

The quantitative findings of PU frequencies do not establish a clear-cut distinction between LSFB and BF, as only a difference between LSFB signers and CorpAGEst speakers was found, suggesting that language itself does not constitute a determining factor in distinguishing PU production in the current study. Furthermore, a more heterogeneous picture revealing the idiosyncratic aspect of PUs among participants was noted. Some signers (e.g., S004) and speakers (e.g., F004) produce more PUs than others from the same corpus group, and others (e.g., C002) fail to produce any at all. This non-systematic use of PUs by participants in favor of an individual preference for its use suggests that there are other factors at play for PU performance, including contextual (e.g., setting) and interactional aspects (e.g., familiarity between individuals and the dialogic nature of the exchange).

The main differences between both languages seems to lie in the interactive roles assigned to this gestural marker in discourse. Signers primarily use PUs for turn-taking and turn managing purposes (including backchannel responses) while BF speakers produce them to manipulate the content of the information conveyed on the palm of their hands (for delivery and common ground purposes). The results echo previous work on the PU in other SLs, including LSFB and LSC (Gabarró-López, 2017, 2020), DTS (Engberg-Pedersen, 2002), STS (Mesch, 2016), and NGT (van Loon, 2012), among others. Yet, this dissertation adds another dimension to these previous studies in that it has pinpointed a distinctive usage of PU functions between the two language communities concerning the management of their conversational activities through the PU.

Overall, the findings presented in this study confirm the main pragmatic usage of the PU (Kendon, 2004) as well as its primary interactional nature, demonstrating that the PU epistemic variant does not constitute the sole port of entry into the world of speakers' and signers' ability to *do* language. Rather, this research has shown that investigating the full range of the interpersonal-interactive functions of PUs provides fascinating insights into the intricate nature of the gesture-sign relationship.

Chapter 4 explored the IFE-G, which exhibits a protruding index finger as its distinctive feature and has mostly been described in terms of pointing in both sign and gesture, the linguistic aspect being attributed with pointing signs, on the one hand, and the non-linguistic aspect with deictic gestures, on the other. However, at the beginning of chapter 4, I made a case for exploring this manual hybrid based on the form it has rather than alluding to the function it serves, as labeling it "pointing" does. This approach allowed me to observe reduced forms of IFE-Gs in the data, which would have been filtered out otherwise, and which turned out to play a role in the management of social interaction.

In this study, acknowledging the interactional uses of the extended finger form in the conversational discourse of LSFB signers and BF speakers has been strongly advocated. I have shown that IFE-Gs are typically not produced for deictically referential purposes only and further this claim by demonstrating that this is not simply the case for speakers in a given SpL but that it also holds true for signers. Although the findings have highlighted that signers use IFE-Gs for pronominal, locative, and determinative purposes, which align with previous work on pointing in various SLs, signers also make use of such forms to express meanings related to the interpersonal nature of their conversation. In particular, they use it to negotiate their turn-at-talk and to provide feedback, including the use of discrete, reduced IFE-G forms where a sole index finger is protruded (see example (1), in section 6.3.1.1., by S001). Another particular feature of IFE-Gs found in signed discourse is the use of a flying index finger (Notarrigo, 2017), typically performed when signers are having trouble with their own utterance production and need a moment to reflect upon what is coming next. In contrast, signers almost never use the IFE-G to deliver new or shared information. One tentative explanation for this is the articulatory constraint imposed on the simultaneous production of referential content through the hands, which does not apply to speakers, who can produce IFE-Gs independently of the concurrent referential content expressed in their speech. In BF, speakers do not use the IFE-G very much to regulate the structure of talk but they do use it to seek following and agreement, especially to attract the addressee's attention through a raised index finger (see example (18) in section 6.3.2., by F001), to express shared knowledge, and to show that they are thinking about what to say next. Subtle differences between both BF corpora concern the delivery of new information, more attested in CorpAGEst whereas the agreeing function was only identified in FRAPé.

The results also reveal that a more stable, constant usage of the form is present across signers in LSFB with respect to IFE-G frequencies, certain form features (hand dominance and handedness), and functions. This difference suggests a higher level of conventionalization of this particular form in the SL under study while more variation is observed in its spoken counterpart, BF. This finding corroborates Fenlon et al.'s (2019) claims that, to some extent, the IFE-G displays different traits when occurring in sign than in gesture. However, it does not mean that the two cannot be reconciled into a unified theory of language and be deployed by language users as they see fit for responding to the ongoing, social, dialogic demands of the interaction. On the contrary, as Shaw (2013) claims: "the prelinguistic index point we first use as infants (Enfield, 2009:91), is never fully cast off from either language but is fully integrated and manipulated by interlocutors based on situational constraints" (p. 12). This study echoes Shaw's words and moves past the preconceived idea that because the IFE-G is treated as part of a linguistic system (pointing signs) in SLs and as a deictic gesture in SpLs, the two are necessarily distinct. Speakers and signers make choices and deploy bodily behaviors that respond to their (and their addressees') needs as the interaction evolves, and the IFE-G is one of such bodily behavior, alongside the PU, that are produced in ways that are sensitive to the general context and respond to both interactional and linguistic constraints imposed on its usage.

In **chapter 5**, I continued to focus on these aspects of interaction management in signers' and speakers' discourses, this time by exploring a gestural form whose manifestation is characterized by a lack of motion (equals to 200 ms or more) where the location, handshape and orientation of the hand(s) remain unchanged and tensed throughout the hold in question.

Meaning expression has too often been associated with movement embodied by the gestural stroke, i.e., the meaning-bearing part of a gesture/sign (usually in motion), pushing other gestural phases (e.g., holds) to the periphery of gestural expression. This chapter resulted in a shift in this conception by showing that an absence of motion does not equal or imply an absence of meaning. On the contrary, not only have I considered these moments of gestural and sign halts as meaningful, but I have also argued for their relevance at the level of social interaction management for SL and SpL conversations. The findings presented in chapter 5 have brought to light a number of parallels between both languages as well as more fine-grained differences with respect to the distributions of holds' interactive roles in each language. These key roles have emerged in the data under four main functions: planning utterance content, monitoring addressees, turn-suspending and turn-holding in language production. Speakers resorted to holds especially for planning and monitoring purposes while signers employed holds for suspending their turn due to addressee interruptions as well as for planning and monitoring purposes (to a lesser extent). In particular, holds have functioned as a means to urge the addressee to provide a prompt response as well as to regulate speakership either as a device for maintaining the floor or ceding it. In turn, addressees became involved in the process by reading "between the signs" (Cibulka, 2016, p. 464), providing the relevant information or performing the correct interactional moves accordingly (e.g., taking the floor). Although not analyzed explicitly, these results suggest that holds are tightly intertwined with the structure and organization of the turn-taking system (Groeber & Pochon-Berger, 2014).

Holds form an integral part of and are inseparable from the range of interactional strategies that are selected by participants on a moment-by-moment basis as the interaction unfolds in time and space. They can be inserted into the main frame of speakership for different purposes, including repair sequences when the addressee intervenes in the main line of action, or be employed by the primary speaker/signer to exhibit a temporary halt in their own utterance production for planning or to check the addressee's following and attention (monitoring). In these cases, holds are combined with other bodily actions such as the gaze shifting away from the addressee in the main speaker/signer's utterance frame to display moments of conversational difficulties as in (26) or body shifting as in (27) as a way to indicate to the addressee that talk is temporarily on hold during the word search. Hence, the combination of the manual hold with other resources is not random.

Another interactional, sequential environment in which holds tend to occur is at the end of a formulated question from the speaker/signer to the addressee, often accompanied by a sustained gaze, which taken together act as a means for formulating an indirect request for the addressee's response as in (22) and (30). In this way, the hold creates a spot in which the addressee's reaction "is not only relevant but also strongly expected" (Cibulka, 2016, p. 465). In turn, the retraction (or continuation) of the speaker/signer's hand(s) indicates s/he has acknowledged the response, revealing the finely timed coordination and functioning of holds in conversation.

Chapter 5 presented supporting evidence for the theory that what might have been seen as purely insignificant moments of non-movement, as mere parts of the excursion of gesture and sign performance, do in reality work as efficient and effective tools deployed by hearing and deaf participants to achieve a number of pragmatic goals during the course of their conversations. I hope the findings outlined above have shown the legitimate need for manual holds to be further considered as part of the meaningful practices used by individuals, and how their investigation leads to a better understanding of human communication.

Lastly, each chapter also explored the affinities between the different gaze directions, the three gestural markers under study, and their respective interactive functions. The results reveal that gaze directions mostly depend on the kinds of functions being conveyed rather than the gestural form itself. For instance, floating gazes are more typical of the planning function when individuals (speakers and signers) are facing difficulties in processing their own utterance production, while addressed gazes are more typical when the speaker or signer is seeking help from the addressee during a word search activity, whether it is a PU, an IFE-G or a hold.

3 Limitations and Major Contributions

During the course of this dissertation, a few obstacles were encountered, mainly methodological ones. While some have been addressed (e.g., inter-rater agreement test), others remain and work should be conducted in order to explore certain issues further. Despite this, the current work has brought gesture and sign a step closer to each other, reducing the gulf that tends to divide these two aspects of language.

First of all, the results obtained reflect the productions of four signers (66 years old and over) from the LSFB Corpus and eight BF speakers, four (66 years old and over) from the FRAPé dataset and four other (75 years old and over) from the CorpAGEst Corpus. Participants were video recorded either in the university lab in Namur (LSFB and FRAPé) or in their homes (CorpAGEst) at a particular moment in time and following particular semi-directed guidelines, sometimes from addressees themselves (in CorpAGEst) or from a third party acting as moderator of the dyadic conversational exchange (in LSFB and FRAPé). These methodological conditions highlight the fact that the present findings need to be approached with a degree of caution, and more work should be conducted in order to confirm (or refute) the current findings. For instance, the inferential statistics offered in each chapter of the analyses do not allow the results to be generalized beyond the current research framework. Instead, these statistics should be viewed as a means to pinpoint and discuss tendencies that have emerged in the data. Furthermore, they have cast light on some aspects that would otherwise not have been perceptible as is the case with the differences between LSFB and CorpAGEst participants, for instance. In future work, though, the number of participants should be enlarged by including more speakers and signers from the same age range but also from other age groups, such as younger individuals in order to conduct intergenerational comparisons within the same language (BF-LSFB) but also across languages and modalities and the focus should be expanded to include other SpLs and SLs as well.

A similar pattern applies to the selected gestural units. At the beginning of this dissertation, a choice was made concerning the kinds of phenomena that were to be investigated as potential interactive practices in BF speakers' and LSFB signers' discourses. As a result, three manual forms along with concurrent gaze directions were ultimately incorporated into the analyses. In that sense, the current conclusions are limited regarding the number of participants selected and the scope of gestural phenomena investigated. In the future, other articulators (e.g., non-manual ones) can be taken into account, offering in this way a more comprehensive picture as regards the engagement of the whole body in the management of social interaction.

One additional aspect that I would like to take into consideration and apply in the near future is the calculation of Cohen's kappa for the annotations of the functions in the SpL corpora. The functional categories were revised following the IRA test conducted on the SL sample only as I was unsure of my ability as a hearing learner of LSFB to functionally annotate the gestural occurrences in a language I do not master. Yet, given that linguistic knowledge did not constitute a determining factor in the attribution of functions (see Chap. 2, section 3.4.4), the changes applied to the annotation protocol provide a useful contribution to the analyses of the data in both modalities, spoken and signed.

Nevertheless, the current research presents unprecedented theoretical (conceptual) and methodological advances. Despite the small-size corpora including a limited range of participants, this dissertation has conducted and presented an in-depth analysis of the forms and interactive discourse functions of the gestural phenomena under scrutiny, the PU, the IFE-G, and holds, respectively. To identify these gestural markers, not just as thoughts occurring inside people's minds, but as they unfold *in* interaction, the traditional view of gesture needed to be reframed in favor of a broader definition which would allow all occurrences responding to the criteria established in Chap. 2 (section 3.3.4) to be taken into consideration. This approach to gesture has provided enough room for novel gestural instantiations to emerge in speaking and signing discourses, i.e., reduced PUs and IFE-Gs in addition to manual holds, offering a more comprehensive, accurate and enriching representation of the ways language users transmit and conceive interactional meanings through their body *in situ*, rooted in context.

Falling within a paradigm shift that is currently taking place among gesturalists and SL scholars (Andrén, 2014; Kendon, 2008; Müller, 2018; Shaw, 2019) who re-establish gesture *in* language, this research contributes to the theoretical gesture-sign debate by bringing a marginalized object of study to the fore. The study conducted has tackled elements that are typically filtered out from scholars' initial analyses in SpLs, and even more so in SLs. By including the interactive dimension of gesture, by analyzing shared gestural instantiations in spoken interaction, on the one hand, and in signed discourse, on the other, and by choosing a particular audience in which to explore these points (older signers and speakers who are rarely ever studied for *their* usage of language), this research is unprecedented. No previous work had been conducted on the patterns that are examined here (but see Bolly et al., 2015; Gabarró-López, 2020 for the PU), applying the same methodological and theoretical frameworks to gesture in spoken and signed conversations. Moreover, the detailed annotations of all the discourse functions that the gestural markers convey in both languages have been successfully implemented by applying the same multimodal annotation protocol to all the data. While the majority of studies devote their analysis to one single function in particular such as the expression of common ground, the regulation of turns, or the planning of discourse, the present study has provided a functional panorama of the three items' discourse roles in SpL and SL interactions. This will provide solid grounds for further work to be carried out.

Another originality that adds considerable value to this project lies not only in the comparison of shared gestural practices in a SL and a SpL, but also in the analysis of data as a result of having available a parallel corpus in BF, FRAPé, built according to the principles established for its SL counterpart, LSFB. The analyses resulting from this direct comparison represent the first cross-linguistic study conducted that allows speakers and signers to be investigated on a par with each other when the same methodology has been applied. This unique approach was taken one step further by the inclusion of a third BF corpus, CorpAGEst, which allowed the results of the direct BF-LSFB comparisons to be put into perspective, offering unique insights.

This research demonstrates the value of examining interaction by selecting tasks in corpora that, although semi-directed to provide guidelines, are not prompted experimentally, but rather correspond to samples of conversational, face-to-face dialogues, thus not restricting the scope of analysis "to [speech] and consciousness of a single speaker" alone (Goodwin, 2006, p. 39). Instead, the current approach to gesture underlines the importance of considering the interpersonal dynamics at play between the participants, both deaf and hearing, who create and shape meaningful utterances through their bodies following the ongoing and mutable flow of the dialogic interaction. This constitutes an almost unexplored field of research in the SL literature, where scholars have mostly investigated phonological and morpho-syntactic aspects of SL structure at the expense of pragmatic phenomena. The same holds true in studies on gesture in SpLs where prevalence has been given to McNeill's (1992) cognitive sense of gesture (see Chap. 1). Hopefully, the current study will provide an incentive to keep exploring pragmatic aspects of language.

The unprecedented nature of this research and the trends that the results have unveiled offer endless and promising research avenues left to be explored in the future, some of which are put forward below.

4 Future Directions

Although this research has met the objectives set out at the beginning of this dissertation, it bears emphasizing that the road toward a unified, integrated theory of language will need more work to be carried out, which will benefit from the systematic, direct, usage-based approaches to signed and spoken languages.

In order to keep exploring the gesture-sign dialectic and the implications for language and linguistic theorizing, there are other issues to address and a number of social components to explore further, for instance, by manipulating the interactional aspects that affect gesture performance and how social interaction, in turn, affects gesture production in signers' and speakers' dialogues.

First of all, expanding the scope of dyadic encounters to multiparty interactions would provide insights into the dynamics at play when individuals are engaged in more complex kinds of conversations that involve more than one addressee, and how this, in turn, affects their use of interactive gestures and those of their conversational partners. Another compelling area to explore would be the degree of familiarity between participants and the settings in which they interact. That is to say, how does the extent to which people know each other (family/friends *vs.* first acquaintances) and where they talk – in different milieus and contexts – affect gesture performance? It would be insightful to have deaf signers recorded in their homes, for instance, in order to conduct parallel comparisons with CorpAGEst speakers and contrast these findings with the ones obtained from participants in the FRAPé and LSFB corpora. The importance of relying on spontaneous, dialogic kinds of exchanges as done in this dissertation (at least, as much as possible) can be contrasted with other genres and tasks (narratives, argumentative, and so forth).

Secondly, speakers and signers make use of much more than the three gestural markers under study to conduct interactive moves in conversations and to include their addressee in the ongoing dialogic flow. Expanding the types and range of bodily articulators to explore other manual (e.g., adaptors) and non-manual gestures (e.g., facial expressions, head, shoulder and torso moves, and footing) in more detail would cast light on Andrén's (2014) lower and upper limits of gesture, and support gesture's relation on a part with sign *in* language. Moreover, it would be insightful to explore the systematic combinations of manual and non-manual articulators (e.g., particular head moves associated with the PU, the IFE-G, and/or holds) to carry out various discourse functions in conversation. This kind of study on the use of manuals and non-manuals in signers' and speakers' use of language would highlight whether idiosyncratic patterns or overlaps between different body articulators appear in the course of different discourse functions.

Analyzing these aspects in future work would sharpen our understanding of the ways individuals engage and organize their talk-in-interaction with their whole body, regardless of modality, and would reinforce the argument for gesture to be given its rightful place *in* language.

Last but not least, ever since my Master's thesis, the various gestural instantiations explored have taken place in the discourse of speakers and signers from a certain age range. However, a lack of more participants (younger and older) has meant that no conclusions have been drawn regarding the aspect of aging in the current findings. In the future, I would like to remedy this by exploring several other dimensions (e.g., intergenerational and longitudinal) that present tremendous societal implications for today's western societies given their aging populations. The physical environment (individuals' homes *vs.* health care facilities) and the condition of participants themselves (comparing healthy elderly individuals *vs.* pathological elderly individuals) would provide some interesting insights. Although some authors have begun to analyze some of these aspects (mostly in SpLs; see Bolly et al., 2015; Duboisdindien et al., 2019), longitudinal studies on older deaf signers and speakers will be required in the future to help family members as well as professionals to respond to the communicative needs of these older individuals. Undertaking further multimodal comparisons that involve younger participants to conduct cross-linguistic and cross-modal analyses, for instance, of intergenerational interactions and in different milieus (e.g., home, hospital, healthcare facilities) would shed light on new ways that different conversational partners can adapt to the communicative context of older adults.

5 Final Thoughts

Looking at gesture makes us, humans, realize that language is much more than "just a linear progression of segments, sounds, and words" (McNeill, 1992, p. 1) and describing certain gestural instantiations across signers' and speakers' discourses, rooted in their respective social and linguistic contexts, ultimately offers a better view of what language is. Gestures do not only mirror individuals' inner thoughts but they also constitute powerful social tools for participants, deaf and hearing, to create and achieve complex interactional goals over the course of a single conversation and to maintain interpersonal relationships with others.

In order to account for this social, interactive nature of gesture in language, the diametric opposition between sign and gesture, the linguistic *vs.* the non-linguistic, needs to be left behind in favor of a more encompassing and integrative definition of language. The acknowledgement of interactive mechanisms in signers' discourse that are typically not considered part of the signing stream, part of language, but that resemble those deployed by speakers in SpLs, allows scholars to contend that humans use their bodies in parallel and meaningful ways. And therefore, spoken languages and signed languages may be less different than scholars have previously assumed.

I believe it is important to end this work with Shaw's (2013) words, which echo the message that has accompanied me on this investigative journey and shaped the entire framework of this dissertation:

> I would not go so far as to say that moving a wine glass is part of language. What I'm saying is that the line between gestures that are meaningful and meaningless (or gestures that are systematized or not) is incredibly difficult to determine (and perhaps analytically useless) without considering its context (p. 275).

Indeed, there is much to be gained in seeing and approaching gesture in language this way.

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Appendix

1 - Transcription Conventions

❖ Speech Annotation for CorpAGest & FRAPé Corpora

Label	Meaning
house	Transcription of words in line with conventional spelling rules
<G>	Onset-Offset boundaries of a gesture
LH/RH	Left Hand/Right Hand
[ ]	Onset-Offset of overlapping talk
(.) and (2.4)	(.) for micro-pauses less than 200ms *vs.* (2.4.) stands for "2 seconds and 400 milliseconds"
?	Intonation marker in questions
/	False starts
(.h) *vs.* (h)	Breathing in: inhale *vs.* exhale
((laugh))	Indicating laughter
(xxx)	Inaudible

See Bolly, C.T. and Kairet, J. (2016). CorpAGEst (2013-2015): A corpus-based multimodal approach to the pragmatic competence of the elderly, *Speech Annotation Guidelines, version 1.3* (last accessed on July 16, 2018).

❖ Gloss Annotation for the LSFB Corpus and Guidelines

Label	Meaning
<G>	Onset-Offset boundaries of a gesture
<PALM-UP>(909 ms)	PU is on hold for 909 ms
LH/RH	Left Hand, Right Hand
++	Indicators of the number of sign repetition (here: twice)
[ ]	Onset-Offset of overlapping signing/speaking
DEAF-CLUB	Gloss for a sign consisting of two words
WANT-NOT	Gloss for sign negation
FS:MANDE	Finger spelled sign for MANDE (name of a village)
PT:PRO1	Pointing sign for 1st person singular
PT:DET	Pointing sign for determiners
PT:LOC	Pointing sign establishing a locus
PT:POSS	Pointing sign for possessing personal pronoun
PT:LBUOY	Pointing BUOYS
DS	Depicting signs

See Johnson's annotation conventions for the Auslan Corpus: Johnston, T., Auslan Corpus Annotation Guidelines, available at http://media.auslan.org.au/attachments/Johnston_AuslanCorpusAnnotationGuidelines_14June2014.pdf (Last accessed on July 16, 2018).

2 – Comparative tables for the interactive functions of PU, IFE-G, and Holds

❖ **Table A: Summary of all interactive functions of PU in LSFB, FRAPé, and CorpAGEst**

Palm-Up [PU]	LSFB	BF	
Function	**C1 (LSFB)**	**C2 (FRAPé)**	**C3 (CorpAGEst)**
(Dis-)Agreeing	++	– –	
Common Ground	– – –	–	+++
Delivery	– – –	+++	+
Digression		– – –	
Elliptical	– – –	– – –	– – –
Face-Saving			– – –
Monitoring	–	– –	– –
Planning	– –	–	–
Turn-Opening	– –	– – –	– – –
Turn-Giving	–		
Turn-Holding			
Suspension		– – –	
Turn-Closing	+–	– – –	
Complex	–	– –	+–

0-5%	– – –
6-10%	– –
11-15%	–
16-20%	+ –
21-25%	+
26-30%	++
+30%	+++

❖ **Table B: Summary of all interactive functions of IFE-G in LSFB, FRAPé, and CorpAGEst**

Index Finger-Extended Gesture [IFE-G]	LSFB	BF	
Function	**C1 (LSFB)**	**C2 (FRAPé)**	**C3 (CorpAGEst)**
(Dis-)Agreeing	+++	– –	– – –
Common Ground	– – –	+	– –
Delivery	– – –	– – –	–
Digression			
Elliptical		– – –	– – –
Face-Saving			
Monitoring	– –	+++	++
Planning	– –	+ –	+
Turn-Opening	+		– –
Turn-Giving	– – –		
Turn-Holding			
Suspension	– –		– –
Turn-Closing	– – –		
Complex	– – –	–	–

0-5%	– – –
6-10%	– –
11-15%	–
16-20%	+ –
21-25%	+
26-30%	++
+30%	+++

❖ **Table C: Summary of all most frequent interactive functions of Holds in each LSFB, FRAPé, and CorpAGEst**

Holds [Hold]	LSFB	BF	
Function	**C1 (LSFB)**	**C2 (FRAPé)**	**C3 (CorpAGEst)**
Monitoring	++	+++	+++
Planning	+++	+++	+++
Turn-Holding	−−−	−−	−−−
Suspension	++	−−−	−−
Complex	−−−	−−−	−−−

0-5%	−−−
6-10%	−−
11-15%	−
16-20%	+ −
21-25%	+
26-30%	++
+30%	+++